

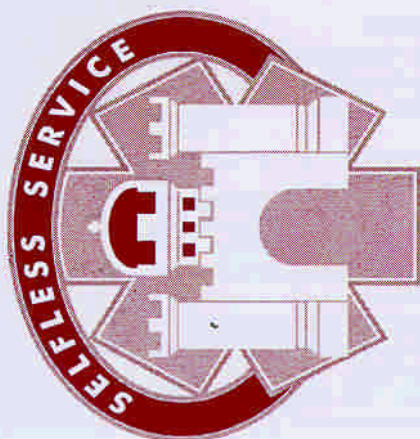
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Perspective

LRMC and Operation Enduring Freedom

Operation Enduring Freedom (OEF) was launched on 7 Oct 01 as the military response to the terrorist attacks of 11 Sep 01. In its role as the opening salvo in the war on terrorism, the OEF mission is to eliminate the Taliban government and the al Qaeda presence in Afghanistan. The operation carries on today as U.S. Special Forces and other Special Operations groups continue to pursue remaining enemy strongholds in the country. Although specific hard-fought battles such as Operation Anaconda have been highlighted in the media, there have also been ongoing casualties throughout the theater of operations during the past year.

The Army Medical Department (AMEDD) maintains a critical role in the Afghanistan theater and in other neighboring countries from which operations are staged. Innovative medical unit concepts, such as the Forward Surgical Team (FST), are being deployed as forward medical units. In the case of the FST, it can perform lifesaving surgeries, due to its proximity to the ongoing conflict. The impact of these units can be measured in both the mortality reduction from combat injuries and the psychological "boost" it provides to the soldiers.

This special issue of the AMEDD Journal highlights the significant ongoing role that Landstuhl Regional Medical Center (LRMC) has served in the management of casualties from OEF. It addresses significant operational issues in casualty management and outlines many of the types of patients seen from the Afghanistan theater of operations. The lead article, *Overview: The First OEF Patients Evacuated to LRMC* summarizes the types of casualties, both combat and non-combat-related, from this military action. As you will read in the various articles, such as *Tracing the Development of a DWMMC (Deployed Warrior Medical Management Center)*, this war has significantly affected day-to-day hospital operations and required new management strategies for the continuous daily evacuations. These articles further underscore the important role of the Army Medical

Department in maintaining the fighting strength of these specialized forces in their ongoing struggle against the forces of terrorism.



Major General Darrel R. Porr

Other articles in this issue of the AMEDD Journal include:

- *The Role of the Operational Physician in a Medical Center.* Describes the specific role of the LRMC surgeons in receiving, triaging, and managing casualties evacuated through the Deployed Warrior Medical Management Center.

- *Impact of 9/11 and OEF on LRMC Operations.* Explains the role of the Operations Division at LRMC in the preparation and execution of its expanded mission in support of Operation Enduring Freedom.

- *OEF In-Theater Evacuation.* A comprehensive study comparing recovery and complication rates from both gallbladder and appendix surgeries done in-theater and at LRMC.

- *Medical Response to the Threat of Bioterrorism: Anthrax and Other Concerns.* Highlights a tracking and reporting process instituted at the European Regional Medical Command to monitor and control reported suspect exposures to biological warfare agents.

- *Chaplains and the Spiritual Needs of Patients and Staff.* Emphasizes the significant role of the LRMC Department of Pastoral Care in serving the spiritual needs of evacuated casualties.

- *Debriefing/Decompression: Psychological Support for OEF Casualties.* Outlines the treatment plans of

psychological trauma endured by combatants from the Afghanistan theater of operations.

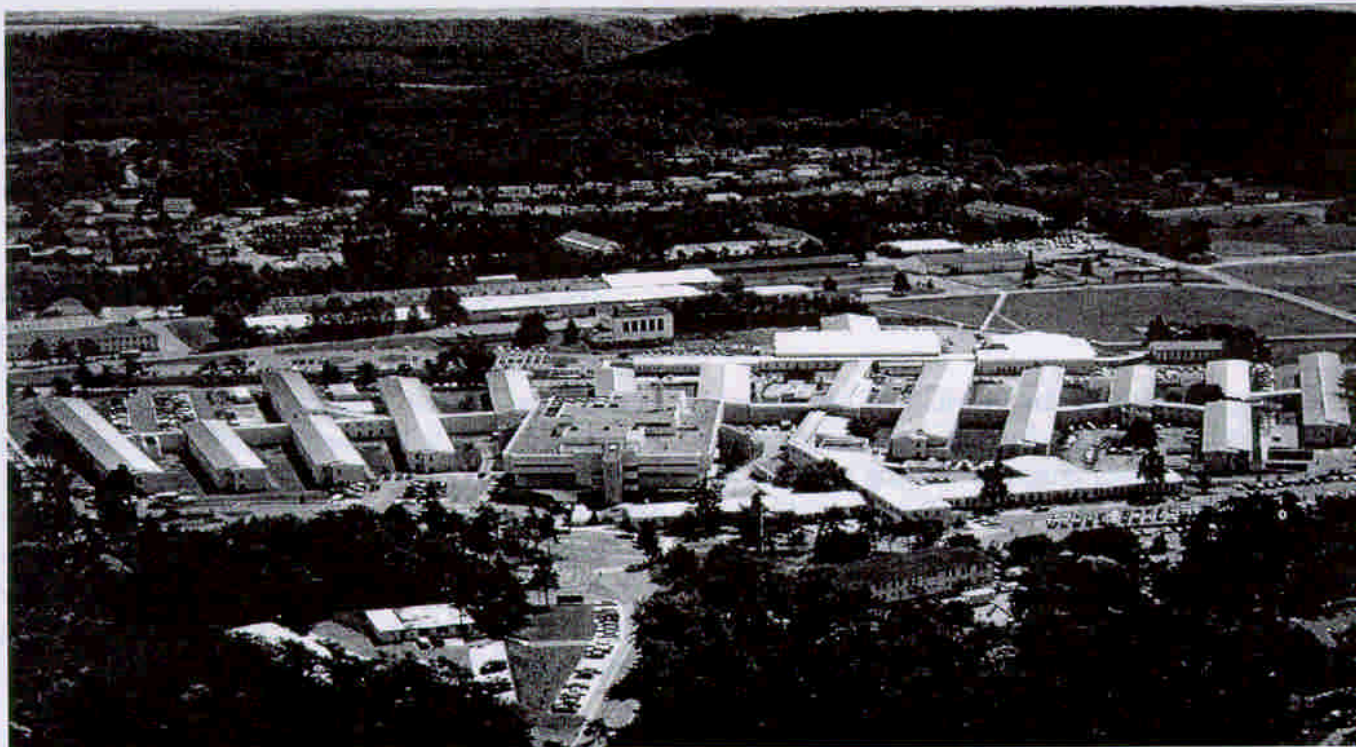
- *Application of TEP Laparoscopic Inguinal Hernia Repair During OEF.* Discusses the specific surgical approach to hernia repair to minimize postoperative recovery time and expedite a soldier's return to duty.

- *LRMC Logistic Support for OEF.* Details the logistic problem areas discovered at LRMC (expansion of

available bed space, requirements for care of additional patients, and establishment of a 500-bed Navy Fleet Hospital) and the actions taken to successfully resolve them.

The unique position and superb capabilities of Landstuhl Regional Medical Center are detailed in the articles in this issue of the AMEDD Journal. But what is highlighted are the unique talents, skills, and dedication of the professionals in all areas of the AMEDD.





Landstuhl Regional Medical Center

From the LRMC Commander

Landstuhl Regional Medical Center's soldiers, airmen, sailors, and civilians report for duty each day understanding a very simple, yet powerfully direct, mission statement: *To serve as America's beacon of health care for its sons and daughters abroad.* And as that beacon, the men and women of Landstuhl Regional Medical Center (LRMC) have been vital participants in the world's current war on terrorism.



COL David A. Rubenstein

The first casualty of Operation Enduring Freedom (OEF) arrived at LRMC on 19 Oct 01. During the ensuing 11 months, over 840 casualties have arrived at this beacon of health care. Included among these 840 casualties have been soldiers, sailors, airmen, marines, allied soldiers, civilian employees, contractors, Afghan fighters, a reporter, an embassy staff member, and a couple of spies. In every case, the staff of LRMC has ensured that every casualty-turned-patient has been expertly cared for and has been expeditiously returned to the area of operations or home station.

Support to OEF has included every aspect of

planning, coordinating, and executing various and simultaneous aspects of the mission. Receiving and caring for casualties has been only one piece of a complex mission. In the face of an unknown number of patients, the staff has planned for the expansion of total beds while ensuring that the provision of health care to the local community and the European theater has not lessened. To this end, the staff has coordinated all requirements to set up in our Landstuhl buildings more than 100 beds of a Navy Fleet Hospital. At the same time, we have built plans to receive and integrate Navy, Medical Command, and Reserve Component personnel to staff these and an additional number of beds.

The various military Services are transforming in the face of high operations tempo and while at war. Likewise, the staff members of LRMC, as with the Services they represent, are facing the challenge of the OEF mission in the face of high operations tempo and other day-to-day duties. Caring for the wounded, sick, and injured of OEF has been accomplished in the face of numerous other ongoing missions.

During the past year, the LRMC staff has balanced the OEF mission while planning and implementing many complex and significant programs. Among these are the Warfighter Refractive Eye Surgery Program (350 eyes treated in first 4 months), Veterans Affairs Benefits on Separation Program (20 days from release from active duty to receipt of final VA benefit decision), 91W Transition Program (currently 41% transitioned), and Picture Archiving Communications System Digital Radiology Program (tying together three hospitals and 28 Army Health Clinics).

The staff has also dramatically increased its presence with and support of medical tactical units during their training exercises. Several times during the past year, the staff has supported major field exercises of the 212th MASH, 160th Forward Surgical Team, and other units. This relationship has included surgical procedures in a field setting, care of patients in the field, an external evaluation of the 212th, and a night move from Western to Central Germany. Landstuhl Soldiers and Airmen have also deployed in support of numerous combat and support missions.

Additionally, a second Landstuhl Fisher House was approved and construction begun: daily, from 11 to 29 soldiers and airmen were away from their primary duties in order to provide force protection for the Landstuhl Kirchberg Kaserne and the kasernes of our eight Army Health Clinics. During the same exciting year, a 303-gram neonate was born at Landstuhl, becoming the fifth lightest baby to survive; and the community was hit with its hardest winter in 50 years during which all snow clearing equipment was diverted to ensure that Ramstein Air Base runways were kept open in support of OEF.

In addition, there was the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The staff continued to care for OEF casualties and day-to-day

patients while preparing for our triennial JCAHO survey. The results were phenomenal. The final score was a 93, the highest score of any Army or Air Force medical center since the Joint Commission instituted its new scoring methodology in Jan 01.

The concept of being an Army or Air Force Medical Center is something else the staff succeeds with on a daily basis. The LRMC staff is joint in every regard, short of receiving an official designation. Our 86th Medical Squadron, with its 300 Airmen, are fully integrated into all aspects of command and staff of the medical center. If the senior noncommissioned officer in a Landstuhl clinic is Air Force, she is the noncommissioned officer in charge. If the senior officer is Army, he is the officer in charge. Colonel John Torrent, USAF, is LRMC's Deputy Commander for Clinical Services.

The media phrase "evacuated to a military hospital in Germany" has become a *nom de guerre* for LRMC. Despite this anonymity, the staff of LRMC has been superb in caring for America's and the world's OEF wounded, injured, and sick. The articles that make up this special issue of the AMEDD Journal tell only a small part of that story.

Our aim has been to describe our endeavors in support of OEF and to share with you our lessons.

My aim has been to share with you the truly amazing staff that serves as America's beacon of health care for its sons and daughters abroad.

From the LRMC Command Sergeant Major



CSM Domingo Costa

When the call comes into LRMC from a location in Afghanistan our soldiers, airmen, and sailors are alerted and, regardless of the time of day or night, prepare to receive wounded "warfighters from downrange."

Our professional enlisted medics and support staff, through many rehearsals and exercises, have been standing by physicians and nurses since the terrorist disaster of last September to treat all categories of combat trauma and nonbattle injuries. The hands-on skills and qualifications of these men and women, at every level, are exemplary. They are representative of the excellence and the standard we expect from enlisted health care providers in every Service and every medical treatment facility.

I have had the wonderful opportunity to watch these experts first-hand. I am comforted by what I see because what they do for the warfighter is what they truly love doing...taking care of their own. They anxiously wait for the arrival of the wounded, injured, and sick with a passion to treat and to heal. You can see it in their eyes; I have. These men and women never once complain of the late hour or the personal hardship. To a person, they are busy wondering about their comrades and the hostile environment in which they find themselves.

When America was struck on 9/11, the world was changed and a new challenge was presented to our enlisted staff...force protection. The LRMC soldiers of all military occupational specialties renewed their skills in weapons safety and use, rules of engagement, interior and exterior guard duty, and guard mount procedures. Since then, Landstuhl soldiers have been on continuous guard duty at our gates and Landstuhl airmen have been on duty at Ramstein Air Base. Our enlisted personnel have shown that they are technically and tactically skilled and able to execute any mission in a flawless manner.

Faced with these many challenges, the LRMC enlisted staff continues to shine. Despite being faced with field training, patient capacity expansion, external tasking, or daily mission requirements, the health care in support of over 300,000 theater beneficiaries is second to none. This includes, in an average day, admitting about 16 patients, performing 17 surgical procedures, delivering three babies, and seeing 2,300 outpatients.

The enlisted staff of LRMC will continue to serve proudly by caring for those who serve in harm's way and, in so doing, help protect the freedoms we all hold so dear.

New Journal Editorial Review Board Members



COL Carla G. Hawley-Bowland, MC

Colonel Hawley-Bowland has replaced COL Glen W. Mitchell as the Medical Corps representative. COL Hawley-Bowland is the Chief, Clinical Services Division, U.S. Army Medical Command and Chief, Consultant, Medical Corps, Office of The Surgeon General, Fort Sam Houston, TX.



SGM Peter Junjulas

Sergeant Major Junjulas has replaced SGM Carolyn S. Miller. SGM Junjulas is the Corps-Specific Branch Proponent Officer, Enlisted Corps, Office of The Surgeon General, Fort Sam Houston, TX.

Special thanks and appreciation go to LTC David Gillespie and LTC Sally Harvey for their invaluable coordination and manuscript review contributions to this special LRMC issue of the Journal.

Overview: The First OEF Patients Evacuated to LRMC

Col James R. Rundell, MC, USAF+

MAJ Damon G. Baine, MS, USA++

Introduction

Since Operation Enduring Freedom (OEF) began in Oct 01, Landstuhl Regional Medical Center (LRMC), has been the receiving facility for a large majority of OEF patients medically evacuated from the OEF area of operations, 638 as of 1 Jul 02. LRMC is the largest U.S. medical facility outside of the U.S., and is the only military tertiary care referral center for Central Command (CENTCOM) and the European Command (EUCOM) geographic areas of responsibility (AOR). It is conveniently located 5 miles from Ramstein Air Base, making it a logical staging and treatment area for patients evacuated from the CENTCOM AOR. The predominant use of a single medical center for patients creates an ideal opportunity for surveillance, tracking, and clinical study.

There is a great deal of attention within military medicine on the need for valid and reliable data to formulate health care decisions during and in the aftermath of armed conflict.¹⁻³ The war on terrorism has characteristics that are, at the same time, similar to and unique from previous conflicts. Like the Persian Gulf War, U.S. forces are often placed in locations far from sources of logistical and medical support, which must be established. However, this conflict involves Special Forces to a degree not publicly seen before, and the nature of the operations is different from the Persian Gulf conflict, owing to the guerilla war-like nature of the opponents' tactics. In addition, forward surgical teams and critical care air transport teams are deployed in a number of locations forward, intended to provide definitive medical care, and a rapid evacuation capability.

There were a number of publications in the aftermath of the Persian Gulf War and other recent conflicts that compared the medical nature of late 20th century conflicts to previous wars.⁴⁻⁹ These publications report a relative decrease in the impact of infectious diseases and nutritional problems, and a relative rise in orthopedic injuries, blast-

related trauma and land mine injuries as a proportion of overall casualties and patients.

Methods

The LRMC established the Deployed Warrior Medical Care Center (DWMCC) during the early weeks of OEF. In addition to managing the flow and tracking of OEF patients, a key function of the DWMCC is to protect the integrity of medical information and documents. A database was established to record a number of key demographic and clinical variables on all patients from OEF medically evacuated to LRMC. The database contains demographic and clinical descriptive data on the over 600 OEF patients consecutively seen at LRMC between 21 Oct 01 and 1 Jul 02. These data were extracted for use in this overview report: gender, military service affiliation, injury/illness classification category, primary LRMC clinical referral service, and administrative/clinical disposition following treatment at LRMC.

Over 95% of OEF patients evacuated from CENTCOM are captured for data collection at LRMC during the course of their clinical evaluation and care. Many patients who come to LRMC from OEF come via the U.S. Air Force hospital at Incirlik, Turkey, first. Most patients who stopped initially at Incirlik moved on to LRMC after initial medical stabilization and acute care. Of 120 OEF patients seen at Incirlik, 34 were returned directly to OEF duty or sent to their home duty station (conversation with Medical Plans and Readiness Office, Incirlik Air Base, Turkey). The remainder were sent to LRMC for further evaluation and care. Of 672 total OEF patients sent to LRMC or Incirlik, 638 were seen at some point during the evacuation process at LRMC (95.1%).

This is a descriptive report on the demographic and clinical characteristics of the 638 LRMC OEF patients. In addition, the clinical group caring for the patients suggested a number of potentially relevant hypotheses.

First, that there were significant differences between male and female patients in terms of clinical services required and in types of disposition. Second, that due to differing missions and responsibilities, there were significant differences among the military services in types of illnesses and injuries. Third, that because of the robust forward deployed medical capability, only a minority of patients evacuated as far as Germany from the OEF AOR would return to duty. Fourth, that medical utilization data and rates of return to duty following treatment could help identify areas for clinical enhancement in the AOR, reducing medical evacuation of some patients. Chi-squared tests were used to determine whether statistically significant associations exist among gender, service affiliation, injury/illness classification, primary referral service and disposition. The level of statistical significance was set at $P \leq 0.05$.

Results

Among the 638 OEF patients, 84% were male, 16% female (Figure 1). Army and Air Force patients represented over 85% of the total number of OEF patients; the remainder were Navy, Marine, civilian, allied active duty, and host nation (Afghan) patients (Figure 2). All of the Afghan patients seen were individuals injured in friendly fire or land mine incidents.

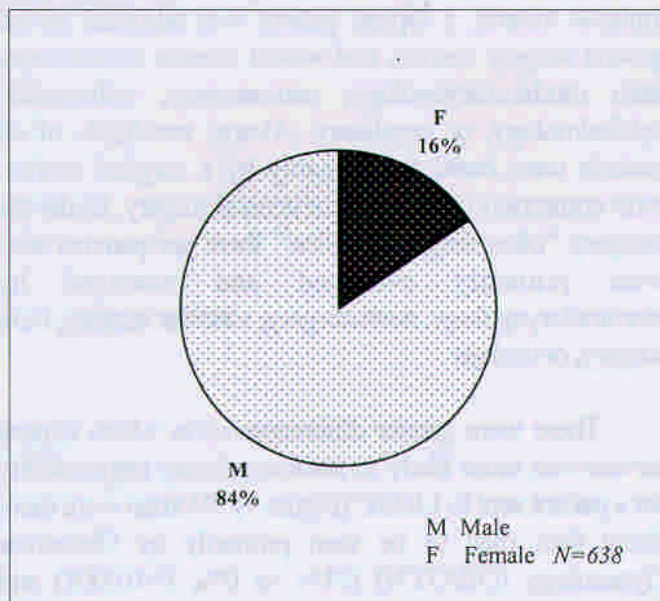


Fig 1. Gender.

Almost 90% of all patients had a condition

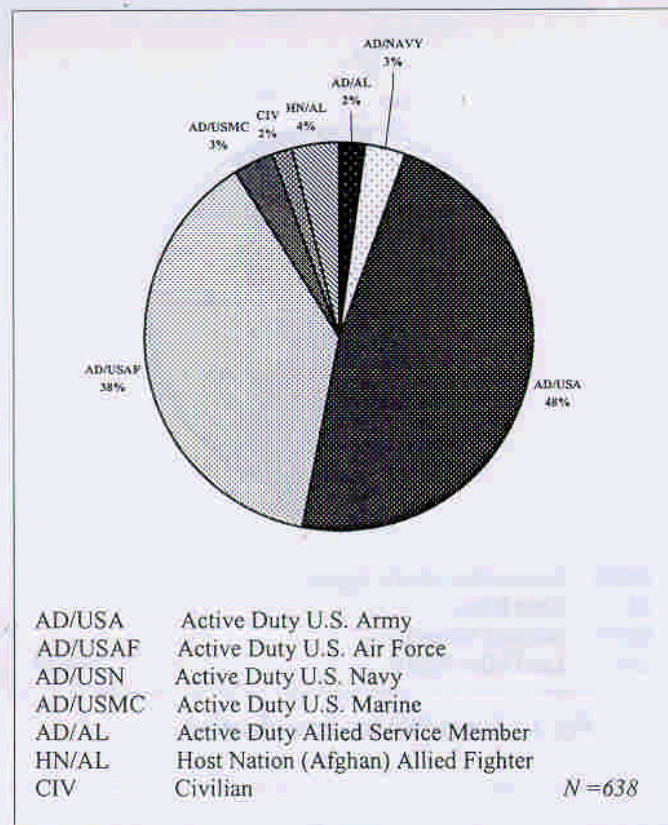


Fig 2. Service affiliation.

characterized as disease/nonbattle injury (DNBI) (Figure 3). The DNBI incorporates all injuries due to accidents and other noncombat etiologies, along with all other medical conditions that required evacuation of the patients from the AOR. The other categories of injury/illness were those due to combat or friendly fire incidents: blast injuries, gunshot wounds, and land mine injuries, collectively accounting for 12% of LPMC OEF patients. Because the number of non-Army or Air Force personnel was small, comparisons among all service affiliations was not feasible. However, comparisons between Army and Air Force patients, and between males and females, were possible.

There were relatively more Army patients than Air Force patients who had been sent for treatment due to blast injuries (8% vs 3%, $P=0.0270$, Figure 4). Similarly, men were more likely than women to have been sent for treatment of blast injuries (11% vs 1%, $P=0.0008$, Figure 5). There were no other statistically significant differences in injury/illness mix between Army and Air Force patients or between male and female patients (Figures 4 and 5).

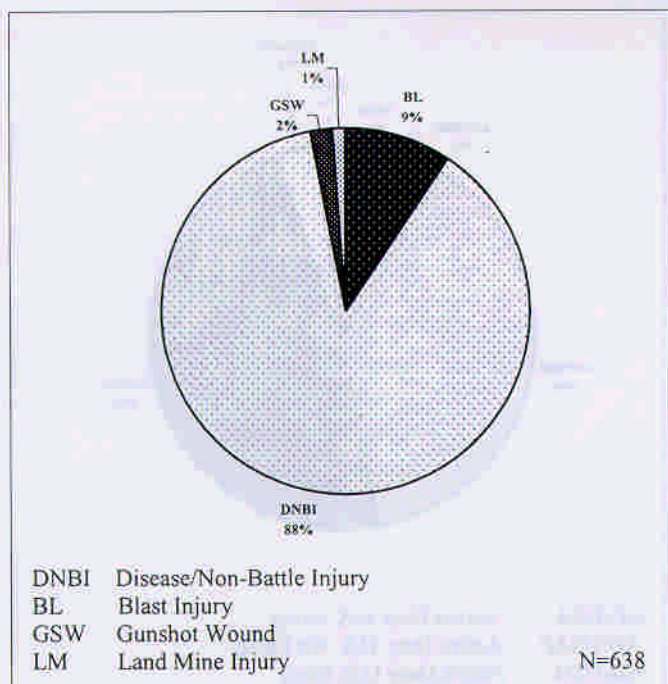


Fig 3. Injury/illness classification.

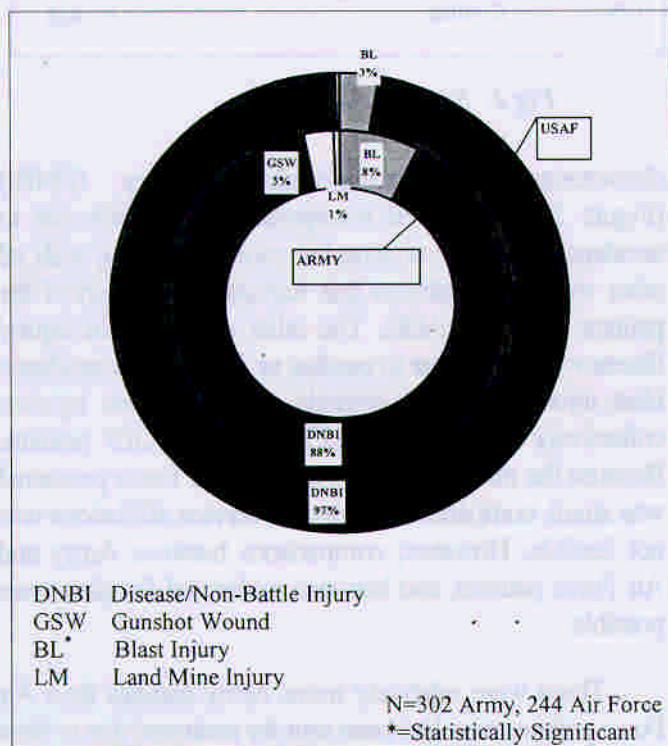


Fig 4. Injury/illness classification: Army/Air Force comparison.

Figure 6 summarizes the frequency with which different clinical services were utilized as primary referral services for OEF patients at LRMC. These data categorize

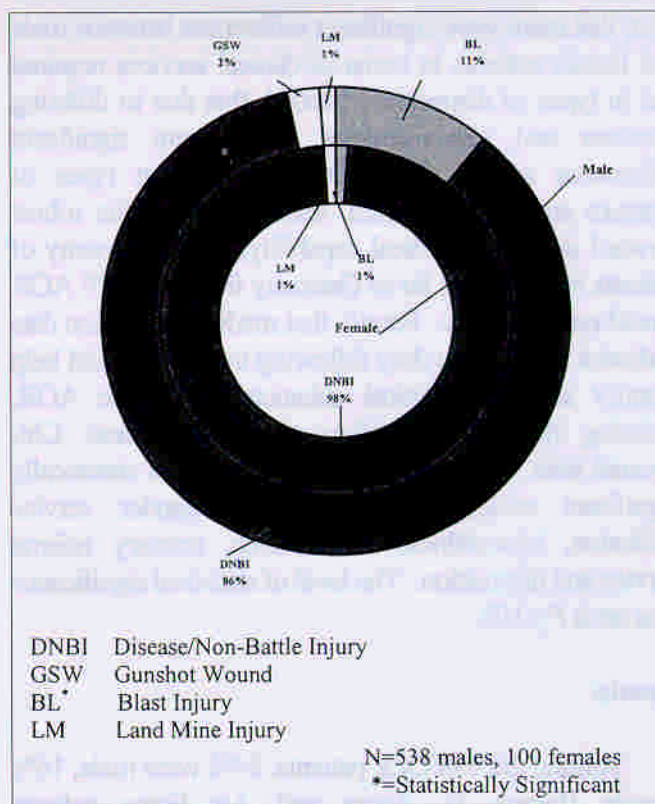


Fig 5. Gender by injury/illness classification.

the service most relevant to each patient's primary condition or injury, though consultations were often requested from other clinical services during the course of their stay. For example, following a blast injury with multiple trauma, a typical patient was admitted to the general surgery service, and would receive consultations from otorhinolaryngology, neurosurgery, orthopedics, ophthalmology, or psychiatry. Almost two-thirds of all patients were cared for primarily by a surgical service, most commonly orthopedics or general surgery. Under the category "other surgical service," there are patients who were primarily evaluated and managed by otorhinolaryngology, neurosurgery, vascular surgery, burn surgery, or urology.

There were gender differences as to which clinical service was more likely to assume primary responsibility for a patient sent to LRMC (Figure 7). Women were more likely than men to be seen primarily by Obstetrics/Gynecology (OB/GYN) (21% vs 0%, $P<0.0001$) and Psychiatry (18% vs 8%, $P=0.0195$). Men were more likely than women to be seen primarily by Orthopedics (32% vs 15%, $P=0.0001$) and Medicine/Medicine subspecialties (24% vs 16%, $P=0.0190$).

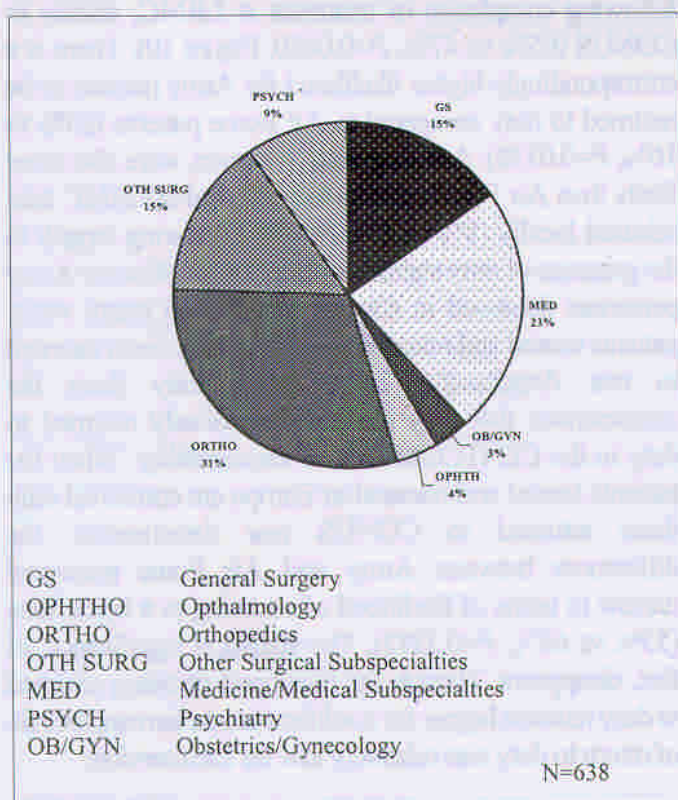


Fig 6. Primary referral service.

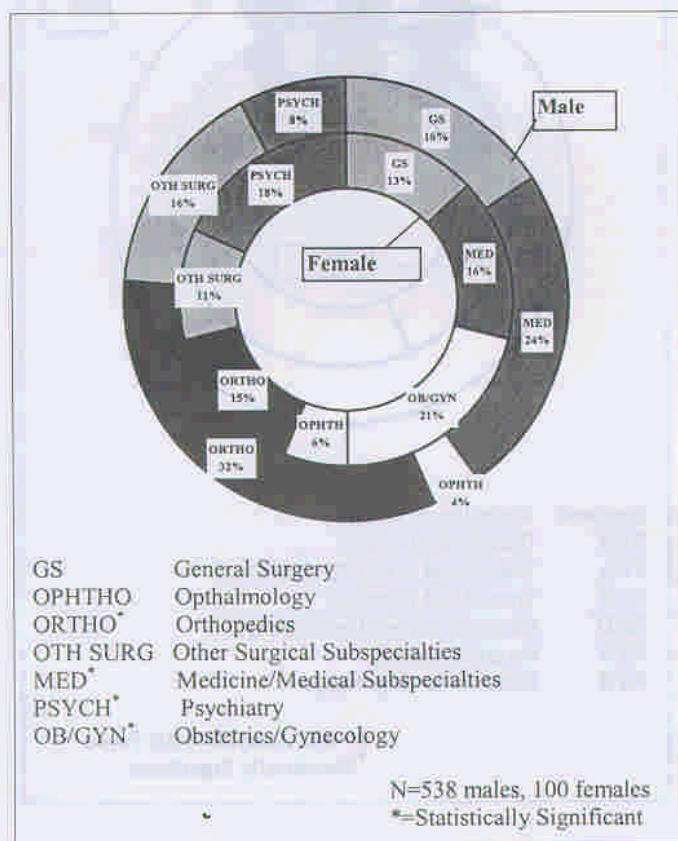


Fig 7. Gender by primary referral service.

Table 1 (see page 11) compares military service affiliation and primary clinical referral service. Because of the relatively small number of patients affiliated with groups other than the Army or Air Force, statistical comparison was conducted only between the two latter groups against primary clinical referral service. There were no statistically significant differences between Army and Air Force patients in terms of likelihood of being seen by any of the categories of primary referral services.

Figure 8 summarizes patient disposition. The data does not reflect the initial LRMC management location, rather, the definitive disposition after treatment at LRMC. Many patients were initially admitted to an inpatient unit, or were boarded on an inpatient unit because billeting was full and patients often arrived late at night. In addition, many patients were initially admitted for observation and discharged to outpatient status the next day. A small number of patients are characterized in Figure 8 as inpatients or boarders. This is because they were current inpatients or boarders at the time data collection for this analysis stopped. Their disposition was yet to be determined. Therefore, these inpatients and boarders, along with Afghan patients, were excluded from a number of the statistical comparisons related to patient disposition.

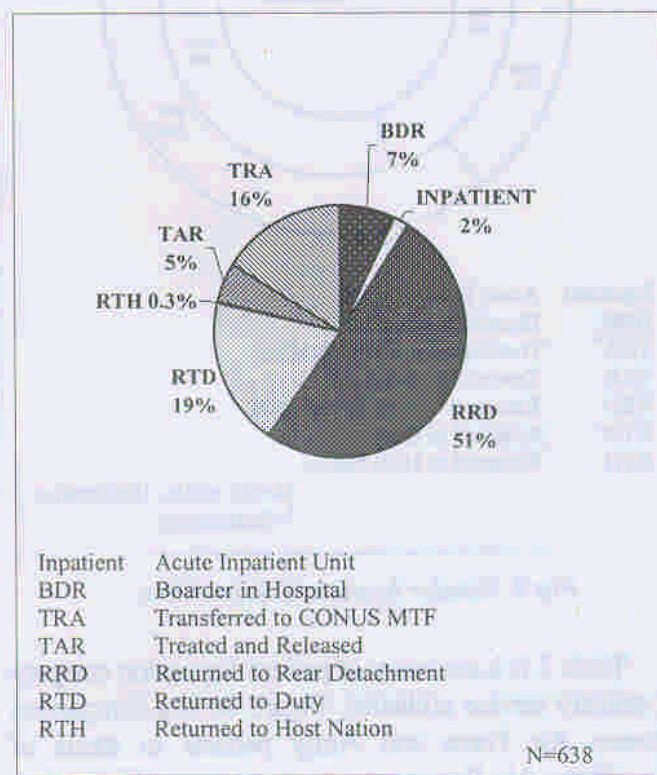


Fig 8. Patient disposition.

Less than one-fifth of patients were returned to duty (Figure 8). That percentage increased only to 21% when Afghan patients, current LRMC inpatients, and current LRMC hospital boarders were excluded from the denominator. Women were more than twice as likely to return to duty as men (35% vs 16%, $P=0.0022$, Figure 9). Men were more than 4 times more likely to be transferred to continental United States (CONUS) medical treatment facilities (MTF) for ongoing care or rehabilitation (18% vs 4%). This is probably related to the higher likelihood that a male patient was injured in a blast, with accompanying multiple trauma requiring long hospital stays and rehabilitation (Figure 5), and to the proportion of women who are evaluated at LRMC for gynecological reasons then returned to duty (Figure 7). There are no other statistically meaningful gender differences in patient disposition.

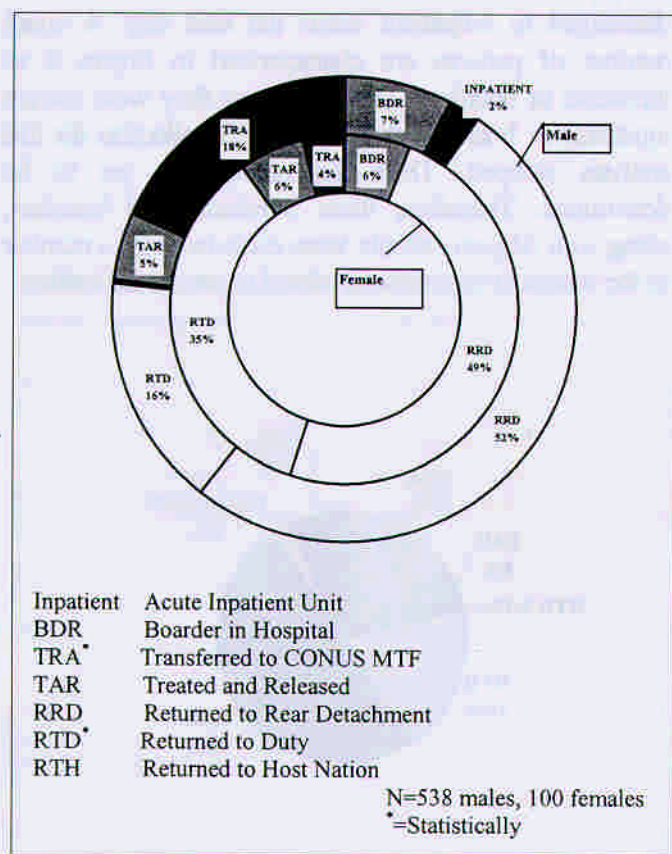


Fig 9. Gender by patient disposition.

Table 2 is a summary of patient disposition category by military service affiliation. Figure 10 is a comparison between Air Force and Army patients in terms of disposition. Air Force patients were more likely than Army patients to be sent back to a rear detachment

following completion of treatment at LRMC, usually in CONUS (65% vs 47%, $P=0.0050$, Figure 10). There is a correspondingly higher likelihood for Army patients to be returned to duty compared to Air Force patients (23% vs 16%, $P=0.0338$). Army patients, however, were also more likely than Air Force patients to be treated at LRMC then released locally (8% vs 1%, $P=0.0005$), owing largely to the presence of duty stations within Europe of many Army personnel deployed in support of OEF. In many ways, patients treated and released are similar to patients returned to rear detachments in CONUS; they share the characteristic that they are not immediately returned to duty in the CENTCOM area of responsibility. When the patients treated and released in Europe are combined with those returned to CONUS rear detachments, the differences between Army and Air Force personnel narrow in terms of likelihood of returning to a home base (55% vs 66%, $P=0.2212$). The statistical significance, in fact, disappears. Though the likelihood of being returned to duty remains higher for a soldier than an airman, the rate of return to duty was relatively low for each service.

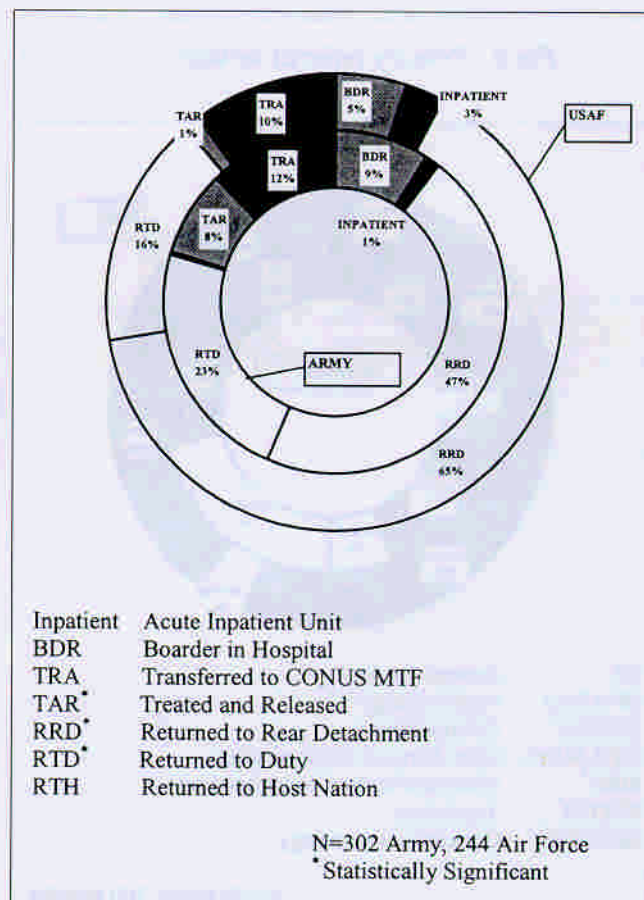


Fig 10. Disposition: Army/Air Force.

Primary Referral Service	Army	USAF	*	Navy	USMC	AD Allied	Host Nation Allied	Civilian	TOTAL
General Surgery	46 46.9%	25 25.5%	NS	1 1.0%	3 3.1%	5 5.1%	16 16.3%	2 2.0%	98 100.0%
Orthopedics	92 47.9%	76 39.6%	NS	6 3.1%	6 3.1%	5 2.6%	7 3.6%	0 0.0%	192 100.0%
Ophthalmology	14 56.0%	11 44.0%	NS	1 0.0%	1 0.0%	1 0.0%	1 0.0%	1 0.0%	25 100.0%
Other Surgical Subspecialty	50 52.1%	34 35.4%	NS	3 3.1%	7 7.3%	1 1.0%	1 1.0%	0 0.0%	96 100.0%
Medicine/Medicine Subspecialty	60 41.1%	62 42.5%	NS	7 4.8%	5 3.4%	3 2.1%	0 0.0%	9 6.2%	146 100.0%
Psychiatry	31 51.7%	24 40.0%	NS	5 8.3%	0 0.9%	0 0.0%	0 0.0%	0 0.0%	60 100.0%
Obstetrics/Gynecology	9 42.9%	12 57.1%	NS	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	21 100.0%
TOTAL	302 47.3%	244 8.2%		22 3.4%	21 3.3%	14 2.2%	24 3.8%	11 1.7%	638 100.0%

Table 1. Military Service Affiliation by Primary Clinical Referral Service (*=Statistically significant difference)

Primary Referral Service	Army	USAF	Navy	USMC	AD Allied	Host Nation Allied	Civilian	TOTAL
LRMC Inpatient Unit	4 33.3%	7 58.3%	0 0.0%	0 0.0%	0 0.0%	1 8.3%	0 0.0%	12 100.0%
LRMC Boarder Unit	27 58.7%	12 26.1%	3 6.5%	3 6.5%	1 2.2%	0 0.0%	0 0.0%	46 100.0%
Transferred to CONUS MTF	37 36.3%	25 24.5%	6 5.9%	8 7.8%	1 1.0%	22 21.6%	3 3.0%	102 100.0%
Treated and Released	24 75.0%	3 9.4%	4 12.5%	1 3.1%	0 0.0%	0 0.0%	0 0.0%	32 100.0%
Returned to Rear Detachment	140 43.3%	157 48.6%	7 2.2%	3 0.9%	11 3.4%	0 0.0%	5 1.5%	323 100.0%
Returned to Duty	70 57.9%	40 33.1%	2 1.7%	6 4.9%	1 0.8%	0 0.0%	2 1.7%	121 100.0%
Returned to Host Nation	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 50.0%	1 50.0%	2 100.0%
TOTAL	302 47.3%	244 38.2%	22 3.4%	21 3.3%	14 2.2%	24 3.8%	11 1.7%	638 100.0%

Table 2. Military Service Affiliation by Patient Disposition

Finally, a patient's primary referral service was usually associated with likelihood of return to duty versus return to rear detachment or transfer to CONUS MTF. Table 3 summarizes patient disposition data compared against primary clinical referral service data. For statistical analysis, patients who were inpatients, boarders, or non-U.S. patients destined to return to a host nation were excluded, leaving comparisons among 578 patients who were either returned to OEF duty or were sent back to duty stations or CONUS MTFs. Patients with a significantly higher likelihood of being returned to duty than the average likelihood of 20.9% for the group at large, included those treated by Medicine or a Medicine sub-

specialty (34.7%, $P=0.0095$), OB/GYN (50.0% vs. 20.9%, $P<0.0001$), Ophthalmology (44.0%, $P=0.0027$), and the combination of other surgical subspecialties (34.9%, $P=0.0015$). Patients with a significantly lower likelihood of being returned to duty than the average of 20.9% included those treated by Orthopedics (5.6%, $P<0.0001$) and Psychiatry (6.0%, $P=0.0095$). General surgery patients were also a bit less likely to return to duty (14.9%, $P=0.1857$) though this difference was not statistically significant.

Discussion

There are significant gender and Service-specific

Primary Referral Service	Transferred to CONUS MTF	Treated and Released	Returned to Rear Detachment	*	Returned to Duty	TOTAL
General Surgery	32 36.8%	4 4.6%	38 43.7%	NS	13 14.9%	87 100.0%
Orthopedics	45 25.3%	17 9.6%	106 59.6%	*	10 5.6%	178 100.0%
Ophthalmology	0 0.0%	0 0.0%	14 56.0%	*	11 44.0%	25 100.0%
Other Surgical Subspecialty	11 12.8%	1 1.2%	44 51.2%	*	30 34.9%	86 100.0%
Medicine/Medicine Subspecialty	9 7.3%	3 2.4%	69 55.6%	*	43 34.7%	124 100.0%
Psychiatry	5 8.6%	7 12.1%	42 72.4%	*	4 6.9%	58 100.0%
Obstetrics/Gynecology	0 0.0%	0 0.0%	10 50.0%	*	10 50.0%	20 100.0%
TOTAL	102 17.6%	32 5.5%	323 55.9%		121 20.9%	578 100.0%

NOTE: Disposition categories not included in this comparison: LRMC inpatient, LRMC boarder, returned to host nation

Table 3. Patient Disposition by Primary Clinical Referral Service (=Statistically significant difference from average likelihood of return to duty)*

differences in types of injuries and illnesses resulting in evacuation from the area of operations of OEF to LRMC. These differences result in a divergence in patient disposition. Only about one-fifth of patients evacuated to LRMC were returned to duty in OEF. This has particular relevance to Special Forces units, who may have severe limits on personnel substitutability.

Women were more than twice as likely to return to OEF duty from LRMC than men. Based on these data, two factors appear important. There is a higher likelihood that males will participate in operations that result in blast injuries and other sources of physical trauma, and there is a high rate of return to OEF duty among women evacuated to Germany for gynecologic and obstetrical reasons. There may be value in placing more OB/GYN evaluation and treatment capability further forward in the CENTCOM AOR. Similarly, patients evacuated to LRMC to be evaluated for internal medicine and ophthalmology problems had rates of return to OEF duty significantly higher than average. This suggests that there might be potential reductions in lost duty time by placing more robust internal medicine and ophthalmologic capabilities further forward. In contrast, patients with

physical trauma and psychiatric patients had rates of return to duty less than one-third of the average LRMC OEF patient. This supports the observation that OEF orthopedic patients will often require rehabilitation that prevents rapid return to effective duty. Psychiatric patients, once out of the battle zone, begin to reconstitute in ways that prevent their assimilation back into their units in the operational zone. Any reconstitution of psychiatric patients, it appears, must be accomplished as close to the area of operations as possible to have a chance for success. This echoes the clinical experience of all previous wars and conflicts. Fortunately, so far the rate of psychiatric casualties in OEF is low in overall numbers and in percentage of overall medical evacuations.

As the war against terrorism continues, it will be interesting to compare the medical experiences to those of previous conflicts, especially the Persian Gulf War. During the Persian Gulf War, there were 21,655 U.S. Army soldiers admitted to Army hospitals in Southwest Asia.¹⁰ Of these, 956 (4.4%) were admitted for battle-related conditions. Among 302 U.S. Army soldiers evacuated to LRMC so far during OEF, 39 (12.9%) have had battle-related injuries. This difference in rates of battle-

related injuries among evacuated Army patients is statistically significant ($P < 0.0001$). However, the conclusion that the average soldier in OEF is more likely to be injured in battle than the average Gulf War soldier must be further examined. The LRMC is an Echelon IV treatment center (fully staffed theater hospital). In contrast, Persian Gulf War patients were hospitalized at either Echelon III (combat zone hospitals) or Echelon IV facilities.¹¹ Our data does not capture soldiers hospitalized at MTFs within the CENTCOM with DNBIs who may have been directly returned to duty at higher rates than those with battle injuries. The LRMC may, therefore, see a disproportionately higher share of battle injury patients than these data would indicate. Nevertheless, OEF operations may expose a relatively high proportion of soldiers, Marines, and airmen to combat, especially those among the Special Forces. It was the experience during the Persian Gulf War that the closer to enemy forces a service member got, the higher the relative risk for sustaining a combat injury compared to a DNBI.¹² Though intuitively obvious, it is an important factor that should be included in medical planning during subsequent operations in the war against terrorism.

Another key difference between OEF and the Persian Gulf War is patient evacuation time. The average time to evacuate patients during the Gulf War to definitive tertiary medical care was up to 3 weeks.¹³ For OEF patients evacuated to LRMC, the average time from decision to evacuate until arrival at LRMC ranged from 18 to 96 hours, depending on the acuity of the patients. This statistic is even more impressive when one recalls that the distance from Afghanistan to Germany is similar to the distance between Germany and the East Coast of the U.S. The LRMC clinicians have also observed that the quality and scope of care provided by physicians in the OEF area of operations is generally outstanding. As a result, patients, whether injured or ill, have access to definitive medical and surgical care before they arrive at LRMC. This forward treatment resulted in relatively short durations of stay at LRMC. The average patient spent less than a week at LRMC before disposition to CONUS or to OEF duty. It will be important to study whether this skilled forward

treatment and rapid movement of patients results in better long-term clinical outcomes.

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Debriefing/Decompression: Psychological Support for OEF Casualties

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Introduction

Debriefing, in all its various forms, is viewed as a process by which individuals can reduce the untoward psychological effects of trauma. The technique is generally conducted as a structured meeting with a focus upon the ventilation of feelings, fears, and the retelling of the traumatic event. The concept of military debriefings has its historical roots in the work completed by General S.L. A. Marshall, a military historian, during World War II. While recording the accounts of individuals within small unit military operations for historical purposes, he noticed that the person's retelling of the harrowing experience served a cathartic purpose, while also allowing other soldiers to correct misperceptions and render support. General Marshall concluded that the process itself appeared to decrease the development of combat stress reactions, restored unit cohesion, and increased readiness to return to battle.

The use of debriefing following an exceptionally stressful event formally entered Army doctrine in the early 1990s. Designed to be conducted by specially trained teams, the concept was not conceived as "therapy or counseling" but, rather, a proactive intervention for normal individuals who have survived an abnormal, and severe, stressor. The model most often employed follows the guidance provided by James Mitchell. Critical Incident Stress Debriefing (CISD) is a highly structured model of group crisis intervention. Conducted in a formal meeting, usually with small groups, CISD is generally held shortly after an unusually stressful incident, and focuses upon dealing with the emotion associated with the event. Within the Army, this method has been employed following a myriad of stressful events, to include combat experiences, training accidents, aviation mishaps, and soldier suicides.

While there is some crossover between psychological debriefings and repatriation, this latter process is an

operational, not medical, mission. Repatriation refers to the process of reintegrating U.S. military personnel, and others, who have been prisoners of war held as hostages by terrorists, detained in peacetime by a hostile foreign government, evaded enemy capture, or were otherwise isolated or missing under hostile conditions. An integral aspect of repatriation involves "psychological debriefing" as well as "decompression," informal and impromptu sessions, as opposed to a formalized intervention. It is important to note that there is a very specific repatriation protocol developed by the Joint Personnel Recovery Agency (JPRA) involving tactical, intelligence, and personnel recovery debriefings in addition to psychological debriefings.

It makes intuitive sense that the provision of mental health support proximal to traumatic events would be beneficial. However, the efficacy of CISD has recently been challenged, given the failure of recent randomized trials to demonstrate the prevention, or reduction, of subsequent post-traumatic stress symptoms. However, it has been argued that these studies did not consider comorbid psychopathology nor address issues of behavioral or social dysfunction – difficulties not necessarily subsumed in the diagnosis of post-traumatic stress disorder. A review of relevant research on early psychological intervention, crisis intervention, CISD, and critical incident stress management reveals support for their continued utilization, but not without caution. In sum, it is this author's contention that a more flexible approach to the provision of debriefing services, one that allows for individual differences, is warranted. The following discussion will highlight the experience of Landstuhl Regional Medical Center's (LRMCs) Psychology Service in providing debriefing and decompression services for Operation Enduring Freedom (OEF) casualties.

Discussion

Since the initiation of OEF in Oct 01, over 700

soldiers, sailors, airmen, and marines have received medical services through LRMC, Germany. The LRMC has served as the "gateway" for nearly all the casualties evacuated from OEF's area of operations. Typically arriving at LRMC 24 to 36 hours after the initial entry into the medical evacuation system, information regarding their condition, as well as the mechanism of injury, was usually available 12 to 24 hours prior to their arrival. This information allowed for predesignation of accepting physicians as well as preliminary treatment planning. The diagnoses have spanned the gamut from exacerbation of pre-existing conditions and new illnesses to sports injuries and combat-related trauma. Most casualties remained at LRMC for 2 to 6 days, with the length of stay determined by their medical stability as well as the aeroevacuation schedule. It soon became readily apparent that a minimum stay of 2 days was essential for most – even if the casualty was "medically cleared" to return to continental United States (CONUS) earlier, recognition of their need for physical rest and psychological "decompression" overrode the desire for a rapid return. The remaining focus of this article will be two-fold, first focusing upon the psychological services provided to members of the U.S. and several allied forces who sustained injuries secondary to land mine explosions, "friendly fire" explosions and combat experiences and, secondly, upon the interventions for incidents classified as repatriations.

Between Nov 01 and Jul 02, there have been nine incidents involving groups of individuals, as well as 33 incidents of individual trauma – a total of 84 individuals. Two of these events were further classified as "repatriations." There was considerable diversity among this subset of casualties, although the vast majority were male. Most were members of the U.S. Army, although there were also representatives of the U.S. Air Force, Navy, and Marines, as well as the Canadian and Australian military. There were members of both conventional and unconventional units, reflective of the military forces involved in OEF. There were officers, noncommissioned officers and enlisted members, with time in service ranging from under 3 to over 20 years. Many had trained, lived, and served together for months; others had had only minimal contact with their fellow casualties. The mechanisms of the physical injuries included aviation mishaps, enemy munitions as well as "friendly" fire, under both training and combat situations. Loss of comrades was not an atypical event, adding

another layer of complexity to the situation. As would be expected, given the etiology of their injuries, a number of these individuals required surgical interventions as well as specialty consultations.

A variety of strategies were employed to provide psychological support for these individuals, with an emphasis upon individualized services. Upon their initial entry into the LRMC medical system, the casualties were met by chaplains and, depending upon the precipitating event, psychologists. The times of the flights varied tremendously; not infrequently "wheels on the tarmac" occurred outside the "normal" duty day, requiring considerable coordination, and flexibility on the part of the staff. The chaplains developed a manning system to ensure availability of, and access to, various denominations. Coordinated efforts with the accepting physician, emergency room, auxiliary services, and patient administration division allowed for an efficient triage, initiation of needed care, and admission.

The flight times ranged from 12 to 16 hours, on military aircraft minimally equipped with "creature comforts." As a result, the provision of "three hots and a cot," frequently translated as a boxed meal, self-care items, and a basic hospital bed for those who were medically stable, held great importance for the casualties, and often provided a conduit for the mental health assets to initiate conversations. The value of having several days of "rest and recuperation" time at LRMC, rather than immediately continuing the arduous transit to CONUS, was underscored by a number of the casualties. A tongue-in-cheek assessment of their readiness to continue homeward was provided in direct relationship with grumblings regarding limited television and computer access; of note, no complaints about the hospital food were received.

A concerted effort was made to assign these individuals to the same or adjoining rooms – the sole exceptions have been for individuals whose medical conditions required care in the intensive care unit. This policy was followed even in situations where the need for medical care did not require inpatient services – these casualties remained "in-house" as boarders. History consistently indicates that individuals who have experienced like events benefit greatly from an opportunity to "fill in the gaps" that invariably exist and achieve closure with one another. Efforts were made to ensure recent

telephonic contact with their families had been made, to include issuing "phone cards" as necessary. As a result of mission demands, a number of these individuals arrived without any personal items, to include their wallets – and the destruction of uniforms was not uncommon, secondary to the physical trauma and subsequent medical care. While the procurement of appropriate clothing and uniforms, as well as military identification and financial support is not usually viewed as an aspect of "medical care," acquisition of these items did have a positive impact upon the casualties' morale.

During the days following their admission, the chaplains and psychologists continued their contact, with efforts to see each individual in the morning and again in the evening. The psychologists, chaplains, nurses and medical staff, kept in close contact, monitoring not only the casualties, but any "burn out" symptoms evidenced by the care providers. Opening conversation gambits with the casualties typically included information about the aeroevacuation schedule, and recent news – to include articles about the event that brought them to LRMC. While the timbre of these meetings was kept intentionally informal, discussions invariably arose regarding the casualties' perceptions and experiences. While not framed as "therapy or counseling," these conversations did provide an initial opportunity for decompression and were felt to have served a therapeutic purpose.

There were also interventions conducted at a group level. While involvement in the group sessions – with the exception of those individuals involved in repatriation – was not mandatory, all who were offered the opportunity participated. However, this form of intervention was not routinely scheduled for every "group" of casualties. There were several instances where it was clearly more prudent to offer individual interventions, rather than gather the larger group together. In order to allow for rest and recuperation, these sessions were held toward the latter end of their LRMC hospitalization, typically 3 to 4 days after the precipitating event, and conducted toward the evening hours to prevent interference with medical care. Logistical concerns presented some obstacles in these situations. For example, many of the casualties were essentially bedridden, given their injuries, and the largest wardrooms could accommodate only four beds. However, to date, the mix of casualties was such that a combination of creative furniture arrangement and use of wheelchairs allowed for

all members of the group to participate. The cooperation of the nursing staffing staff was paramount – they helped transport patients, rearranged checks of vital signs, ensured that the casualties were as comfortable as possible, and monitored visitors to prevent interruptions.

There were four general groupings with this subset of casualties: those who were injured in isolated incidents – landmines, snipers; casualties of "friendly fire" bombings; individuals involved in aviation mishaps; and those injured secondary to a large combat operation – Operation Anaconda. In addition, there were several groups who had been isolated from friendly forces, resulting in a requirement for repatriation. Individually, with rare exception, the men appeared psychologically "sound," coping with their experiences in a reasonable manner.

While the larger debriefings shared more commonalities than differences, there were subtle variations between the groups. Not surprisingly, those who had lived, trained, and worked together for longer periods of time tended to be more cohesive. Compared to the other groups, those injured as a result of "friendly fire" expressed more anger and less trust. For those who had lost colleagues, grief was invariably present with some members also struggling with issues of "survival guilt."

The provision of these debriefings followed the general CISD model. Following an introduction speaking to the structure of the process as well as confidentiality of the session, the debriefer prompted a facilitated discussion of each member's actions during and recall of the event, then elicited thoughts and reactions. Lasting from 1½ to 3 hours, these sessions were emotional and powerful experiences. Concluding with the debriefer providing reassurance and education regarding stress symptoms, there was also an emphasis upon both the normalcy of such reactions, coupled with a positive expectation for resolution. The underlying theme for this, as well as the individual meetings, was that the behaviors and feelings were that of normal people, having normal reactions, to a very abnormal event. Afterwards, many spoke of the importance of "putting the pieces together." For most, the debriefings proved an initial opportunity to "tell their stories" and reconnect with the other casualties. There was also a general consensus regarding the importance of the emotional catharsis within a supportive environment. While the long-term impact of these interventions upon

individual functioning will be difficult, if not impossible to ascertain, on-going contact with a number of these men suggests that these services were beneficial.

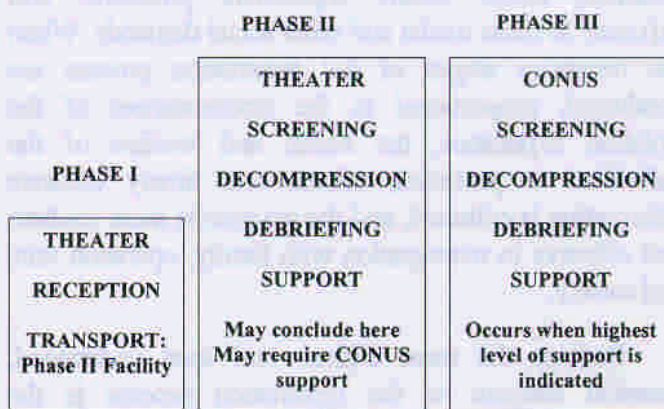
As noted earlier, in contrast to psychological debriefings, repatriation is an operational mission. While there are many similarities between the two processes, there are also significant differences, underscored by the fact that repatriation is an operational mission. Under the guidance of the JPRA, the organization dedicated to the recovery and reintegration of military personnel, repatriation includes a series of "debriefings," each with a different goal. The intelligence and personnel recovery debriefings gather information to assist various military agencies with operational issues, threat assessments, and "lessons learned" for operators in the field. Combined with the psychological debriefings, these sessions also serve a critical decompression function by allowing the returnees to thoroughly process their experience and receive feedback from "subject matter" experts regarding their actions. In doing so, the returnees can exit repatriation without lingering questions regarding their mission performance.

Survival, Evasion, Resistance, and Escape (SERE) Psychologists are specially trained in the emotional and behavioral aspects of captivity, detention, and return. Specifically credentialed to provide repatriation support, to include one-on-one intervention and group counseling for the returnees, SERE Psychologists monitor all aspects of the repatriation process, continually assessing the returnees' mental status and guarding against psychological exhaustion. In addition to the medical care providers and SERE psychologists, significant participants in the repatriation process include chaplains, public affairs, and judge advocate personnel.

The repatriation process can include three phases. Phase I begins when the returnee first comes under U.S. military control and continues until arrival at the in-theater reception location, in this case LRMC, the Phase II site for both USEUCOM and USCENTCOM. Ideally, a SERE Psychologist would be involved from the point of initial return, and then accompany the returnee to the Phase II location. Phase II consists of more in-depth medical treatment, initial debriefings, and personnel actions – often, repatriations can be completed during this phase. Phase III begins when the returnee is transported to CONUS and

ends when required SERE and intelligence debriefings are completed, and the returnee is declared fit for duty, discharged, or retired. Phase III occurs most commonly when the level of required repatriation support and/or complexity exceed the capability of the Phase II location.

Repatriation Process



Complexity and Support

It is important to note that the "fog and friction" that defines combat operations can, and usually does, impact the repatriation model. In reality, repatriation is a flexible, dynamic process, requiring tolerance and adaptability to varying amounts of ambiguity and frustration. While passage from one phase to the next can be a smooth transition, more times than not, other factors intervene. As an operational mission, repatriation is directed by Command – the length of the command chain can run from the first line leader to the Commander-in-Chief. The tactical situation may preclude involvement in Phase II or III, with the availability of equipment and personnel playing a critical role in that decision. Unfamiliarity with the repatriation process can lead to a command bias toward immediately returning the repatriated individuals back into battle – there certainly have been situations where the repatriated individual strongly desired to remain in the fight following the initial debriefings.

As mentioned previously, the debriefing, decompression, and reintegration of the returnee is an integral aspect of repatriation. It is well established empirically, from both investigative literature and past

repatriation experiences, that the accuracy of critical intelligence and operation information degrades with time, and can be significantly impacted by emotional distortion. As such, a timely internalization of the experience, resulting in an accurate understanding of the event, is one of the goals in the debriefing process. This process includes several critical elements which, when executed correctly, minimize the potential damaging effects of post traumatic stress, family adjustment problems, and exposure to mass media and other social demands. When the necessary stages of the repatriation process are conducted, proportional to the circumstances of the isolation experience, the health and welfare of the individual is protected, critical and timely accurate information is collected, and the returnee is more resilient and effective in reintegration with family, operation unit, and society.

Perhaps the most critical, and least understood, essential element of the repatriation process is the unstructured group and individual decompression time. It is essential that the returnees have time together in an unstructured, unsupervised environment to tell "war stories," discover "where you were when" and to normalize their ordeal. Past experiences indicate that failure to allow for this experience increases the likelihood that upon returning home, the returnees will focus upon and amplify feelings of helplessness and failure, emotions that can lead to long-term psychological problems. Decompression provides the returnees an increasing sense of equilibrium and autonomy, providing the avenue to regain a sense of predictability and personal control back into their lives – factors that were sorely tested during their isolation experience.

What seems intuitive and obvious in executing repatriation isn't necessarily so. While the pressure to immediately conduct comprehensive and exhaustive debriefings and then rush the returnees home to family and the public is well-intended, it leads to degradation of critical information and avoidable psychological damage to the returnees. Repatriation experiences of the majority of Department of Defense returnees since South East Asia bear out this fact. Chronic psychological maladjustment, familial discord, alienation from the military, and emotionally distorted incident informational recall are the predictable result when repatriation is compromised by external pressures.

In the repatriation events that have occurred secondary to OEF, all involved groups of individuals who were isolated in enemy territory were as a result of equipment failure. The majority sustained injuries as a result of the mishaps, significantly limiting their ability to perform evasion strategies. Fortunately, none were captured, although the threat certainly existed. Rescue efforts were immediately engaged, although this was not necessarily known by the isolated personnel, with all recoveries made within 24 hours. For one of the repatriations, a SERE psychologist was present at the time of rescue, and accompanied the group to LRMC. Following initial treatment of their physical injuries, they were evacuated to LRMC, typically within 24 to 36 hours of their recovery. Met upon their arrival by the SERE Psychologist, their medical needs were addressed and initial timelines regarding the repatriation process and return to CONUS, were identified. While tailored to their unique experiences, psychological debriefings and decompression efforts played a substantive role in each repatriation. Many of the same interventions utilized with the other casualties again came to the fore, with the chaplains playing key roles. With these individuals, as well as with several of the other groups of casualties, a "handler," an uninjured member of the same, or similar, unit was detailed to serve as a "link" to home commands providing administrative and logistical support, invariably proving to be a source of great assistance. However, harking back to the need for flexibility and adaptability, one group remained at LRMC for an extra week, secondary to the initiation of a safety investigation board exploring the cause for their "hard landing." While the majority of the Phase II repatriation process had been completed by this time, the impact upon their decompression was palpable.

For all the casualties, irrespective of "category," contact with family was supported and encouraged, via telephone calls, video links, and e-mail. However, reunions were not encouraged prior to the casualties' return to CONUS. In addition to the relatively brief time they remained at LRMC, these men required time to rest, readjust, and decompress prior to handling even normal family interactions. Past experiences with like situations revealed that families who waited for in-person reunions until after this initial period report more satisfying initial interactions with their loved ones.

Not surprisingly, all of these events resulted in multiple requests for interviews by the media. In general, members of the special operations units declined involvement in press conferences and interviews – the military members who agreed were provided with training from the public affairs officers, who also developed question guidelines for the press. One significant “glitch” occurred when casualties from one of the “friendly fire” bombings was filmed during their initial arrival and triage. While the purported purpose was to document a mass casualty experience for internal use, this was not effectively conveyed to the injured men. Not only were these individuals exhausted, wounded, and grieving for their comrades, most were assigned to unconventional units where anonymity is a valued commodity. This negative experience set the initial tone for their hospitalization, and required considerable effort on the part of the staff to overcome – additional filming has not occurred. Many high-ranking officials visited with the casualties, providing coins as well as words of encouragement and support. The vast majority of these visits were welcomed by the casualties, although they were all given the option of declining such attention. The presentation of awards resulted in a variety of emotions, with the individuals involved in the “friendly fire” incidents describing considerable ambivalence for an award based upon “someone’s mistake.” However, these ceremonies also provided a venue by which the valor and sacrifices of these men were publicly honored.

For those who had lost comrades, the grieving course was frequently complicated by an inability to participate in the memorial services, typically due to their own injuries as well as transportation issues. To assist in providing closure, these men were often given the opportunity to participate in the “Fallen Service Member Ceremony” conducted at Ramstein Air Base where the remains are transferred for their final journey home. While an emotional experience, participants spoke of its importance in honoring their comrades.

Finally, the quality of these interventions may well be impacted by the dynamic interplay between the group and the debriefing leader, with acceptance and trust, key factors. Gaining entry into groups of combat veterans by members of the mental health community can be difficult, given the lore regarding the potential impact upon security clearances, career options and promotion – acceptance by

members representing special operation units can heighten the challenge. Several critical elements appeared to ease any reticence, to include the possession of an appropriate security clearance and attaining the confidence of the group’s “handler.” Finally, completion of SERE training by the psychologist was felt to be critical – while certainly not an equivalent experience to those undergone by these men, it did allow for a “common language,” and opened the door for later interventions.

Summary

It is vital to have an appreciation for the precipitating experience – and an understanding that not all will be affected by the event in the same degree. The underlying premise to psychological debriefing and decompression is that the somatic, emotional, and cognitive reactions following a traumatic event are normal. If treated as psychiatric casualties, “psychologically broken” and “in need of fixing,” the natural tendency for human beings is to accommodate that expectation and become such patients. Interventions based upon a pathological and diagnostically oriented framework may well overshadow positive expectations and undermine individual resilience. In sum, this experience, albeit subjective, supports the contention that debriefings should be tailored to both the individual and the context. In the event that a group debriefing is felt to be warranted, a keen awareness of the process is also critical – a poorly conducted debriefing carries the same risk as performing a defective medical procedure, with risks of undesired outcomes and complications. Finally, a willingness to leave one’s office, shuck the white coat, and take on duties outside the “textbook” definition of a mental health provider is the final requirement in this triad. Our soldiers, sailors, airmen, and marines are often placed in harm’s way – we must fulfill our promise of returning them home in the best possible physical and psychological health. Psychological debriefings and decompression are important elements of that pledge.

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A Severe Case of NLV Gastroenteritis: Case Report/Lessons Learned

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A patient with Norwalk-like viral (NLV) gastroenteritis evacuated to Landstuhl Regional Medical Center (LRMC) during the May 02 Bagram epidemic presented with an unusually severe illness with clinical features suggesting meningoencephalitis, and laboratory evidence of disseminated intravascular coagulation. The severity of illness among the initial cases of the epidemic raised a broad differential diagnosis of potentially life threatening disease, and raised alarm regarding a potential epidemic of a catastrophic disease. This case is presented to alert clinicians to the spectrum of illness of NLV gastroenteritis, to the potential role of respiratory protection to prevent nosocomial transmission, and to the prospects of rapid diagnostic tests and vaccine development.

Introduction

Epidemic gastroenteritis, due to Norwalk-like viruses (NLV), poses a significant risk to military forces as evidenced by the recent outbreak among British military personnel stationed at Bagram, Afghanistan.¹⁻³ The NLV gastroenteritis is usually a brief, self-limited illness featuring nausea, vomiting and diarrhea, abdominal pain, malaise, headache, myalgia, and low-grade fever. However, severe cases can lead to dehydration; of the estimated 23 million cases that occur annually in the U.S., up to 50,000 require hospitalization, and up to 300 have a fatal outcome.⁴

A patient with NLV gastroenteritis who was evacuated to LRMC from Bagram during the May 02 epidemic presented with an unusually severe illness suggesting a broad differential diagnosis of potentially life threatening diseases. This case is presented to alert clinicians to the potential spectrum of illness caused by NLVs, to the potential role of respiratory protection to prevent nosocomial transmission, and to the prospects for rapid diagnostic tests and vaccine development.

Case Report

A 29-year-old man developed the abrupt onset of shaking chills, nausea, emesis, and watery non-bloody diarrhea on 14 May 02. He lived in the same tent as a soldier who had been evacuated with vomiting, diarrhea, and meningismus. The ill tent mate had vomited on the patient on 13 May.

On initial evaluation, the patient appeared acutely ill. Temperature was 37°C, blood pressure 140/90, pulse 100 and regular. Physical findings included rigors, epigastric tenderness, photophobia, a positive Kernig's sign, and hyperreflexia. The remainder of the physical exam, including mental status, was unremarkable; no lymphadenopathy, petechiae, or other exanthems were noted. Initial laboratory findings included leukocyte count of 11,300 cells/mm³, hemoglobin 15.6 gm/dL, platelets 158,000/mm³. Liver and renal function tests were normal. A stool culture for enteric pathogens was negative. He was treated with intravenous fluids, benzyl penicillin 1.2 million units, and cefotaxime 2 gm IV q 6 hours.

His condition deteriorated rapidly over the next day with fever of 39.4°C, a fall in hemoglobin oxygen saturation to 80%, severe rigors, decreased urinary output, and obtundation. His Glasgow Coma Scale score decreased from 14 to 4. Pleural friction rubs were noted at the lung bases, but there were no other changes on physical examination. A lumbar puncture yielded clear, colorless cerebrospinal fluid with 4 leukocytes per mm³ with mononuclear pleocytosis, and glucose of 4 mm/L. Blood cultures, and gram's stain and culture of cerebrospinal fluid were negative. Hematologic parameters disclosed a decreasing leukocyte count to 5,200 cells/mm³ with neutrophilia, toxic granulation, and relative lymphopenia (600 cells/mm³). Hemoglobin had fallen to 12.5 gm/dL, and platelet count to 124,000/mm³. Coagulation studies disclosed elevated prothrombin time (PT) of > 20 seconds, activated partial prothrombin time

(APTT) to 37 seconds, and increased fibrin degradation products (FDP) to $>10, < 40 \mu\text{g/mL}$, suggesting disseminated intravascular coagulation. Serum albumin had dropped to 2.8 G/dL, and bilirubin had increased to 2.1 mg/dL. He was suspected of having enteritis due to enterotoxigenic *Eschericia coli* with evolving disseminated intravascular coagulation. He was treated with intravenous fluids, mechanical ventilation, sedation and neuromuscular blockade (midazolam, morphine, and vecuronium), other measures of supportive care, additional doses of cefotaxime, penicillin, and an intravenous dose of acyclovir.

He underwent urgent aeromedical evacuation to LRMC. He received intravenous fluids, cefotaxime, Penicillin, ciprofloxacin, and acetaminophen during the evacuation. He defervesced, and blood pressure, oxygenation, and urine output were stable during the flight.

By the time he arrived 15 May, he was afebrile and vital signs were stable. He was a heavily sedated man on a mechanical ventilator with a Foley catheter in place. He was passing brown, non-bloody diarrheal stool. There was diffuse peripheral edema, but no petechiae, purpura, other exanthems, or lymphadenopathy. Physical examination of the heart, lungs, abdomen, integument, and vasculature were otherwise unremarkable. Laboratory findings included leukocyte count of $5,000 \text{ cells/mm}^3$ with 78.8% neutrophils, hemoglobin 12.7/hematocrit 36.9%, platelet count $100,000 \text{ cells/mm}^3$. The PT was elevated to 18.1 seconds, INR 1.45, but APTT was normal (32.9 seconds). The FDP were positive at a serum dilution of 1:4. (normal: not detectable). Screening chemistries disclosed decreased total protein (4.5 G/dL; normal 6.3-8.2 G/dL) and serum albumin (1.8 G/dL; nL 3.6-5.0 G/dL), but normal transaminase levels and renal function tests. Urinalysis disclosed microscopic hematuria but was otherwise unremarkable. Negative or nondiagnostic studies included: stool for fecal leukocytes; stool culture for *Salmonella*, *Shigella*, *Aeromonas*, *Campylobacter*, *Vibrio* sp, and *Eschericia coli* O157:H7; cultures of the urine and blood; an examination of the peripheral blood for malaria parasites; antibody titers against *Leptospira* sp and Congo-Crimean hemorrhagic fever (CCHF) and dengue viruses; and chest x-ray.

Diagnostic considerations included: bacterial enteritis with bacteremia; dengue shock syndrome; prodromal

CCHF; rickettsioses; anicteric leptospirosis; and cerebral malaria. Given a broad differential diagnosis including CCHF, he was initially isolated in a negative airflow room with contact and airborne transmission-based precautions. He received supportive care including mechanical ventilation and hydration, and antibiotic therapy with intravenous levofloxacin 500 mg q 24 hours and doxycycline 100 mg IV q 12 hours. He had a fever of 103°F on the second hospital day, but remained afebrile throughout the remainder of the hospitalization. He had a brisk clinical recovery, was conscious and extubated on the second hospital day. Within 36 hours of arrival, he had completely regained normal mental status, with resolution of all gastrointestinal symptoms. He experienced a brisk diuresis with resolution of peripheral edema. Platelet count reached a nadir of 90,000 on the second hospital day. By the third hospital day, there was mild leukopenia ($4,600 \text{ cells/mm}^3$) and anemia (hemoglobin 13.9 G/dL, hematocrit 40.9%) but coagulation studies had returned to normal (platelet count 156,000; PT 13.1 seconds, INR 1.05, PTT 28.6 seconds). Renal function and transaminase levels remained normal. Doxycycline and levofloxacin were discontinued on the second and fourth hospital days, respectively. Isolation was discontinued on the third hospital day, as CCHF was realistically excluded.

On the fourth hospital day, NLV was confirmed in the stools of other patients evacuated from Bagram to the United Kingdom with similar clinical presentations by using electron microscopy, an antigen-capture enzyme-linked immunosorbent assay (ELISA), and reverse transcriptase polymerase chain reaction (RT-PCR). The patient was discharged in asymptomatic condition on no medications. A stool sample forwarded to the Central Public Health Laboratory in the United Kingdom tested positive for NLV by RT-PCR.

Discussion

The NLVs constitute a genus of human enteric pathogens within the calicivirus family of small round structured single-stranded ribonucleic acid (RNA) viruses. The genus consists of numerous viruses within three major groups.

Vehicles of transmission include contaminated water, shellfish, and mollusks that concentrate virus during filter feeding and other foods contaminated either at their source

or by infected food handlers.⁵ The NLVs are relatively resistant to chlorination and temperature, as evidenced by outbreaks traced to cooked oysters.^{6,7} Secondary transmission occurs primarily through the fecal-oral route, possibly by fomite transmission, and by aerosols generated during projectile vomiting, or by environmental aerosols generated during the cleaning of areas grossly contaminated by vomitus or stool.⁸⁻¹³ There is controversy whether suspected airborne transmission is due to inhalation, or by contamination of hands while touching environmental surfaces that have been contaminated by aerosolized vomitus, followed by ingestion of handled foods.¹¹ Vomiting, and frequency of vomiting, were identified as major risk factors for secondary transmission in households during a large community outbreak.¹⁴ Secondary transmission is amplified in closed populations living under crowded conditions.

The NLV outbreaks in military populations are common, and continue to compromise military operations.^{1-3,13} Recognition of NLV gastroenteritis during the Bagram epidemic was confounded by the severity of the first three cases.³ Atypical features of our patient's illness included: high fever; photophobia; meningismus; obtundation; laboratory evidence of disseminated intravascular coagulation; and catabolism suggested by decreased serum albumin and total protein levels. Peripheral edema was probably due to intravenous fluid resuscitation in the setting of hypoalbuminemia. Transient hemoglobin desaturation and oliguria, microscopic hematuria and thrombocytopenia may have been due to preclinical disseminated intravascular coagulation. This case was distinctly unusual: in a community-based epidemic in Sweden during 1999 involving 79 adults and 114 children and in a 1998 outbreak at Fort Bliss, TX, resulting in the hospitalization of 99 U.S. Army trainees for observation and hydration, meningismus or obtundation were not reported.^{2,14} Thrombocytopenia was noted in 37% of patients undergoing complete blood counts during the Fort Bliss epidemic, however, the frequencies of coagulopathy and hypoproteinemia in NLV gastroenteritis are not known, since most patients do not undergo extensive laboratory evaluations.² This case demonstrates the potential of NLV gastroenteritis to mimic a wide range of potentially life threatening diseases, including cerebral malaria, rickettsioses, bacterial sepsis, prodromal viral hemorrhagic fevers, and other causes of acute meningoencephalitis. The very rapid onset and

progression of illness favored a primary gastrointestinal infection with systemic features, rather than a systemic infection with gastrointestinal manifestations.

The severity of our patient's illness was possibly related to a large inoculum from close contact with the vomitus of the index case. The NLV pathogenesis is incompletely understood; studies have been limited to human volunteers due to the lack of in-vitro and animal models.¹⁵ Because NLV infection is thought to be localized to the gut, the severe extraintestinal manifestations of our patients' disease were probably immunologically mediated. A recent volunteer study suggests that individuals with blood type O phenotype may be predisposed to NLV infection and disease, while those with types B and AB may be relatively resistant.¹⁶ Whether other host immune factors or strain-specific virulence are operational is not clear; the identification of subclinical disseminated intravascular coagulation in this case raises the possible role of immune activation by endotoxin traversing damaged intestinal epithelium as a co-factor.

Viral gastroenteritis is typically a clinical diagnosis of exclusion. The development of a field-expedient rapid diagnostic test to identify NLVs in stool should be given a high priority. Rapid laboratory diagnosis of severe cases would obviate diagnostic uncertainty, potentially hazardous therapies, and aeromedical evacuation for a brief, self-limited illness. Rapid laboratory confirmation would also enhance prompt recognition of epidemics and early implementation of preventive measures.³ Confirmatory tests are currently available at reference laboratories. These include electron microscopy of stools to identify NLV virions, identification of viral RNA by RT-PCR, and ELISA tests to detect viral antigen in stools and potentially contaminated food or water.^{3,17}

Treatment of NLV gastroenteritis is supportive. The identification of vomiting as a major risk factor for secondary transmission raises the hypothesis that the use of parenteral antiemetic medication for symptomatic care may also decrease the risk of contagion.¹¹

Because of initial diagnostic uncertainty and a differential diagnosis that included prodromal CCHF, the aeromedical attendants who transported the patient used contact isolation and wore M-95 masks during the

transport. Contact and airborne precautions were used during the early part of the hospitalization. The possibility of transmission by aerosols generated during vomiting, and the identification of vomiting as a major risk factor for transmission suggest that respiratory droplet precautions might be appropriate while caring for NLV patients, although the value of respiratory protection to prevent nosocomial transmission has not been empirically validated.^{11,18} Masks should be considered while cleaning environmental surfaces grossly contaminated by vomitus or stool. The use of a virucidal disinfectant is recommended to decrease fomite transmission.¹⁰

Since the abrupt onset of gastroenteritis during flight could be disastrous for an aircrew, active surveillance for both the medical and nonmedical flight crew that transported the patient was extended for 4 days after completion of the mission. Although the incubation time for NLV gastroenteritis is usually 24 to 48 hours for primary cases, the incubation of secondary cases may take longer, possibly due to a lower inoculum.¹⁴ There were no secondary cases among the aircrew or hospital staff who cared for this patient, although there were secondary cases among those who transported and cared for patients evacuated to the United Kingdom.³

A vaccine for military personnel, travelers, and others at increased risk may be the most practical preventive strategy.^{1,15} The development of an NLV vaccine will be challenging, since the immunologic determinants of protective immunity are not well understood. Protective immunity may require repeated exposures; long-term protective immunity is not conferred by a single episode of infection. The short-term protective immunity conferred by natural infection may be strain-specific, as it apparently does not protect against heterologous serotypes.¹⁹

Recombinant Norwalk virus-like particles (rNV VLPs), consisting of recombinant viral capsid protein, generate both mucosal IgA and serum IgG antibody responses in mice following oral or intranasal administration.^{20,21} The rNV VLPs have been safe and immunogenic in humans in Phase I clinical trials.²² The rNV capsid proteins expressed in genetically modified potatoes are immunogenic in both mice and human volunteers.^{23,24} This raises the prospect of an edible, food-borne vaccine, which would facilitate repeated exposures to maintain immunity, and polyvalent immunization

against heterologous strains. A potato-based vaccine would not require refrigeration during storage or shipping, and could be administered under austere conditions during a military deployment. Volunteer challenge studies are needed to determine the clinical protective efficacy of rNV VLPs and to determine if protective immunity is cross protective against heterologous strains.¹⁵

In summary, severe, atypical NLV gastroenteritis can raise a differential diagnosis of potentially life threatening diseases. Although NLV gastroenteritis is a brief, self-limited illness, it can temporarily incapacitate individuals and military units. Common-source epidemics propagated by secondary transmission under austere, crowded conditions degrade operational readiness. The possibility of transmission by aerosols generated during vomiting, and the identification of vomiting as a major risk factor for transmission suggest a possible role for respiratory protection while caring for vomiting NLV patients.¹⁸ A prolonged incubation for secondary cases may support extended surveillance of mobile mission-essential contacts performing critical tasks.¹⁴ The development of a field-expedient rapid diagnostic test, and further vaccine research should be given high priority.³

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Tracing the Development of a DWMMC

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Introduction

Landstuhl Regional Medical Center (LRMC) has been the major referral center for all patients being air evacuated from the European Command (EUCOM) and now the Center Command (CENTCOM) Theaters. For the past several years, soldiers evacuated from Bosnia and Kosovo have arrived at LRMC for tertiary medical care. Most recently, soldiers in need of higher levels of medical care have come from the Afghanistan area of operations during Operation Enduring Freedom (OEF). After leaving their units, soldiers often become detached and isolated as their medical work-up proceeds.

The increase in patient volume resulting from soldiers evacuated out of the Afghan theater of operation has resulted in significant delays in the management of routine patients being cared for by the doctors at Landstuhl. There are nearly 300,000 beneficiaries in the catchment area served by LRMC. The number of soldiers evacuated out of CENTCOM averaged 20 patients arriving to LRMC and 20 departing per week. Management of the medical care of these deployed warriors is critical to maintaining quality care in a busy tertiary hospital. Communication is essential to keep all parties involved in the soldier's well being informed. As such, LRMC needed to develop a systematic and organized way to manage the care of these Deployed Warriors. This article describes the process of developing the Deployed Warrior Medical Management Center (DWMMC) for this purpose.

Aeromedical Evacuation of Soldiers during OEF

Landstuhl is the focal point of level three medical care for all U.S. and coalition service members in the EUCOM and CENTCOM Theaters. Landstuhl receives a number of patients from many areas throughout the theater. Prior to arriving at Landstuhl, these individuals receive care according to military medical doctrine, but

may need more comprehensive care unavailable in their immediate area. Patients arrive with diagnoses ranging from lower back pain to landmine injuries (Figure 1).

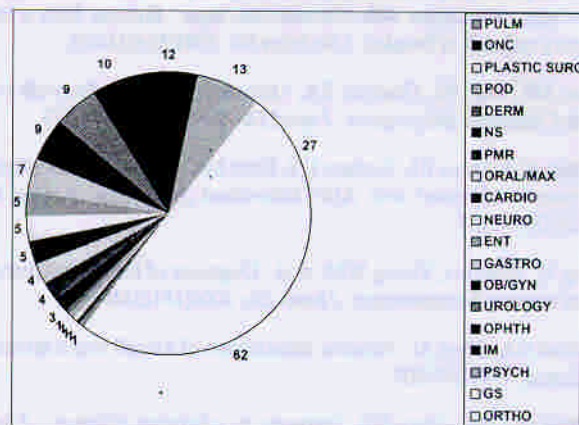


Fig 1. OEF LRMC patients by primary treating specialty.

Soldiers cared for by the Forward Surgical Teams are evacuated from the Afghan theater of operation to higher echelons of care. Prepositioned Combat Support Hospitals or Expeditionary Medical Support provide an interim level of care not available in the far forward areas. Soldiers are either evacuated without stopping at this interim level of care or may receive emergent care there. Many patients are evacuated out of CENTCOM directly to LRMC.

The U.S. Air Force controls evacuation of soldiers out of Afghanistan. The Joint Patient Movement Requirements Center (JPMRC) coordinates the aeromedical evacuation of patients in and around CENTCOM. The Theater Patient Movement Requirements Center-Europe communicates with JPMRC and organizes the evacuation of patients out of CENTCOM into the EUCOM. Patients are evacuated out of the Theater to the Aeromedical Staging Facility (ASF) located at Ramstein Air Base in Ramstein, Germany. Communication between the LRMC triage officer and these agencies helps to resolve any conflicts in patient movement.

Once a patient is determined to require additional services, a patient movement request is processed through the TRANSCOM Regulating and Command and Control Evacuation System, also known as TRAC2ES (Figure 2). This is a new system developed since Operation Desert Storm. It gives patient demographic information, the treatment history of the illness or disease, medications the patient is taking, and any special instructions from the treating physician. Landstuhl's Patient Administration and Air Evacuation Section uses TRAC2ES to determine which patients are to arrive at Landstuhl. The TRAC2ES system also allows personnel to track the location of the patients at any point during their medical air evacuation. Though most patients are regulated, some literally show up on the doorstep needing care without any prior warning. Unregulated cases are infrequent, but can place a heavy burden on the hospital staff.

care in an effective manner that not only met their needs, but also made the most efficient use of the Landstuhl staff. The hospital organized a team to develop a system that would provide dedicated service to these patients. The team was composed of clinical providers and administrators focused on these functional areas:

- Screening and needs assessment
- Medical care coordination and case management
- Patient tracking
- Travel assistance
- Concierge-type service for other needs
- Information and assistance

Organization of the DWMMC

The group then assessed staffing, space/quarters and equipment requirements, and how the operation would be controlled. The group also considered the fact that Landstuhl is the only U.S. Army Hospital with Air Force personnel embedded in its Table of Distribution and Allowance. Included in this staff are airmen designated to man the ASF. The DWMMC was the result of the team's collaboration.

Initial Screening and Physical Assessment

In the reception phase, a DWMMC physician staff member meets patients after being ground transported from Ramstein ASF to LRMC. This designated physician performs an initial hands-on assessment of patients to confirm their condition and determine if the patient should go directly to a ward or to the emergency room for an additional assessment. The DWMMC staff members orient these patients to the hospital and nearby community support services and coordinate their appointments. Whether the patient is here for an outpatient appointment or admission to the hospital, a chaplain and the services from the Red Cross are available to provide assistance, support, and information for the individual and any accompanying escorts. Lodging and meals are provided to all personnel evacuated from the CENTCOM Theater. One of the most impressive tasks accomplished during this phase is the comfort needs assessment done for each patient. Many times patients are medically evacuated without time to obtain vital items or lose these items in the

PATIENT MOVEMENT REQUEST DATA PROTECTED BY PRIVACY OF 1974			
PATIENT DEMOGRAPHICS			
Patient Name ID	Service M11 Grade E08 Age 44 Year	Cite # 0213520028 Gender Male	Precedence/Routine Distinction 2A Special M
Nationality UNITED STATES			
ADMINISTRATIVE DATA			
Originating MTF: AS470 - Kuwait Armed Forces Hospital Destination MTF: AS400 - LANDSTUHL MEDICAL CENTER		Originating CAC: OKJH Destination CAC: E1AH	
Attending Physician: Dr. Word Name: Last MMR Date Changed By: S. S. Accepting Physician: open regulated Max Stage: Max RCHs:		Ready Date: 135 2002 Reason Required: CC Source System: T/WEB Com Phone: Com Phone: Com Phone:	
CLINICAL DATA			
Primary Med Spec: SOC-Orthopedic Surgery Secondary Med Spec: SOC-Orthopedic Surgery Other Med Spec:		Primary Diagnosis: 823.80-FX TIBIA NOS-CLOSED Secondary Diagnosis: 823.81-FX FIBULA NOS-CLOSED Other Diagnosis:	
Patient: 44 Y/O MALE E-B FELL FROM HELICOPTER WHILE REPELLING AND SUSTAINED ABOVE INJURY. NO IMPLANTS OR History: HYBRID HERE TO PERFORM DEFINITIVE FIXATION. HE WILL BE TRANSPORTED TO LANDSTUHL M.C FOR ORTHO CARE. P.T.S EXTREMITY IS STABLE. TRANSFERRED FROM THE USS TRENTON (13TH WAY TO KUWAIT) TADUSARIC			
MEDICATIONS (2 rows)			
Medication Name	Dose	Frequency	IVs (0 rows)
Diloxyl	50/75mg	4 to 6 hrs PRN	IV Location: Shoulder
Tylenol		4 to 6 hrs PRN	IV Location: Right chest
Special Diet: none			
VITAL SIGNS AND LABS			
T: F	P: 70	R: 18	BP: 110/70
HGB: 14.0	HCT: 40.0	WBC: 12.0	Platelets: 210,000
DRAINAGE (0 rows)			
Drainage Location	Type	Suction Type	Suction Amount
PMI DATA			
Cardiac Monitor: N	Suction: N	Pulse Ox: N	Inhaler: N
Ventilator: N	Pump: N	SpO2: N	Tracheal: N
TRANSPORTATION INFORMATION			
Orig Transport Name:	POC:	Com Phone:	DSN Phone:
Dest Transport Name:	POC:	Com Phone:	DSN Phone:
ADMIN REMARKS:			
USS TRENTON MD IS L1 0213520028 BROUGHT HIM TO KUWAIT IS THE POC FOR MEDICAL EVACUATION FOR USS TRENTON CITE#			
ATTENDANTS (1 row)			
Attendant Name	Status	Grade	Age
M11		E08	22 Year

Fig 2. Example of a patient movement request.

Needs Assessment for LRMC and Evacuees

Because the frequency and volume of these patients could quickly overwhelm Landstuhl's limited resources, a systematic way was needed to receive them. This would ensure that these patients could receive the appropriate

process of evacuation. Items such as ID cards, ID tags, money, and in some cases, a change in clothes become very crucial after treatment is rendered and the individual is awaiting transport back to their unit or to the continental United States (CONUS) for further care. In cooperation with local military agencies, such as the Army and Air Force Exchange Service and other commercial vendors, the DWMMC staff is able to meet most of the soldier's needs. The staff has a stockpile of backpacks, phone cards, watches, cameras, shoes, and various clothing items, both civilian and military. Additionally, patients are able to receive replacement ID tags, ID cards, and receive casual pay with the presentation of their deployment orders.

Medical Care Coordination and Case Management

After the initial screening assessment, the patient is either admitted for inpatient evaluation or guided to an outpatient clinic visit. Outpatients are instructed to go to their appointment and then report to the nurse manager at the DWMMC for daily follow up. The nurse manager or the DWMMC physician can answer any questions or problems the patient has during this evaluation. The DWMMC physician interfaces with the consulting physicians on a daily basis to help them answer questions regarding returning patients to duty or returning patients to the rear for more complex evaluations.

Patient Tracking

The DWMMC physician and the nurse manager communicate frequently with the patients' downrange commanders. This interaction helps reduce the stress that commanders experience regarding the care of their soldiers. In addition, communicating directly with unit commanders helps clarify their expectations of soldiers return to duty. Soldiers are also encouraged to contact their units and families themselves, and are given access to telephonic and e-mail communications to facilitate this.

Concierge Type Service for Other Needs

The DWMMC provides aid in a variety of ways to facilitate the soldiers' travel. Photo identification is necessary for any soldier to travel on a civilian commercial airline. Once a disposition has been determined for a given patient, the DWMMC helps obtain the necessary documentation needed for travel. Patient travel destinations vary from CONUS to EUCOM to

CENTCOM. The Deployed Warrior Center works closely with the Air Evacuation Office at LRMH as well as the in-house contract travel agency and the passenger terminals at Ramstein and Rhein-Main Air Bases to ensure the soldiers are returned to duty or continue on to their home base in CONUS as quickly as possible. Transportation to the air transportation point is coordinated and provided by the DWMMC staff.

Information and Assistance

In the final phase – care and disposition – the DWMMC team focuses on accounting for patients, monitoring their care, and meeting administrative requirements. The patients at Landstuhl for outpatient appointments check in daily while ward staff accounts for patients admitted to the hospital. A nurse case manager assesses the progress and treatment plans for all patients to ensure the most efficient use of their time and to minimize their time away from their unit. When a patient is ready to transfer out of the hospital, the attending physician fills out all required paperwork, while a physician on the DWMMC team reviews it for comprehensiveness. Additionally, a record of the patient's treatment is given to the patient for placement in the individual's treatment record to provide continuity of care. Lastly, members of the team ensure that all clinic visits are entered and coded in KGADS (Ambulatory Data System) software to ensure proper workload credit.

Success of the DWMMC

The LRMH has received more than 700 patients from OEF. Eighty-five percent have been treated on an outpatient basis providing the DWMMC with multiple challenges. Comments received by the LRMH commander indicate that the majority of the patients have been overwhelmed by the compassionate care the providers and DWMMC staff demonstrate on a daily basis. Likewise, commanders from the small units in the desert to the senior staff in the Pentagon, are pleased with the information on the location and condition of their soldiers, sailors, airmen, and marines that the DWMMC provides daily.

Conclusion

The system setup by Landstuhl is unique and was designed based on the special needs of the hospital due to

its location and support requirements. As a result, and at least at this point, the overseas medical centers will derive the most benefit from organizing an identical system. However, as our nation refines its new missions as a result of 11 Sep and the subsequent War on Terrorism, more medical facilities may find a need to develop systems to manage the care of our Deployed Warriors.

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DODJ 45?, Patient evacuation to and from CONUS.

AUTHORS:

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Application of TEP Laparoscopic Inguinal Hernia Repair During OEF

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Laparoscopic inguinal hernia repair compared to conventional open repair has been shown to lessen the postoperative pain and have a more rapid return to normal peacetime activities. The totally extraperitoneal (TEP) repair, one of three laparoscopic inguinal hernia repairs, has not been previously described in regards to hastening the return of an active duty member of the armed forces to wartime activities.

Introduction

Since Ger performed the first laparoscopic hernia repair 20 years ago, controversy has existed about the utility of the procedure.¹ The first TEP repair was described by Ferzli and associates in 1992.² The main arguments against the TEP repair are: (1) conventional inguinal herniorrhaphy is an effective operation already performed as an outpatient procedure with low morbidity and mortality; (2) conventional herniorrhaphy may be performed under local anesthesia whereas the TEP usually requires general anesthesia; and (3) the TEP is more expensive. The TEP repair has the following potential advantages: (1) less postoperative discomfort and pain; (2) reduced recovery time and an earlier return to full activity; and (3) easier repair of a recurrent hernia because the repair is performed in tissue that has not been dissected previously; (4) the ability to treat bilateral hernias; (5) the highest possible ligation of the hernia sac; and (6) an improved cosmesis.³

The indications for the TEP repair are recurrent hernias and bilateral hernias. A relative indication is treatment of an uncomplicated, unilateral hernia; this role is as yet unresolved.⁴ Both open and TEP repairs are performed at Landstuhl Regional Medical Center (LRMC). The TEP repair is offered as an option to appropriate patients.

The LRMC is in a unique situation to support Operation Enduring Freedom (OEF). The forward surgical assets, Mobile Forward Surgical Team, Combat Support Hospital, and Expeditionary Medical Support in the area of responsibility (AOR), the Middle East and Southwest Asia, are not equipped to support conditions that require convalescence. Elective operations, such as hernia repairs,

are not performed in the AOR. All elective, urgent and postoperative patients are evacuated out of the AOR to LRMC. The condition of the patient dictates whether convalescence is undertaken at LRMC and the patient then returns to the AOR or the patient is further evacuated to the U.S. The types of surgical conditions managed at LRMC have included incarcerated hernias, uncomplicated hernias, cholecystitis, multisystem trauma, gunshot wounds, and orthopedic injuries.

Two patients specifically have been evacuated to LRMC from the AOR for elective TEP repair of their uncomplicated hernias with the goal of quick return to wartime activities.

Case Reports

Two active duty males were referred and evacuated to LRMC for surgical consultation to obtain the TEP repair. Both were in their twenties and had uncomplicated, unilateral, right inguinal hernias. Both underwent an uneventful TEP repair for right, indirect inguinal hernia and had no evidence of a contralateral hernia.

The patients were admitted to the hospital for one night and discharged to billeting the following morning. They were reevaluated 4 days later and it was determined they were fit for duty, as evidenced by minimal pain and no signs of wound infections. They were sent back to the AOR without activity limitations. Follow-up after returning to duty is not available due to security reasons.

Surgical Technique

The patients were placed in the supine position with both arms tucked and underwent general anesthesia. A 1-

to 1.5 centimeter infraumbilical incision was made and advanced through the subcutaneous tissues (Figure 1). Retractors were used to expose the right anterior rectus sheath. A 1-cm incision was made in the anterior sheath, and the underlying rectus muscle was then retracted laterally, exposing the posterior rectus sheath. A balloon dissector was inserted through the incised tissue onto the posterior sheath and advanced toward the symphysis pubis. The balloon was then inflated with air and then removed. The preperitoneal space was maintained with gas insufflation of 12 mmHg pressure.

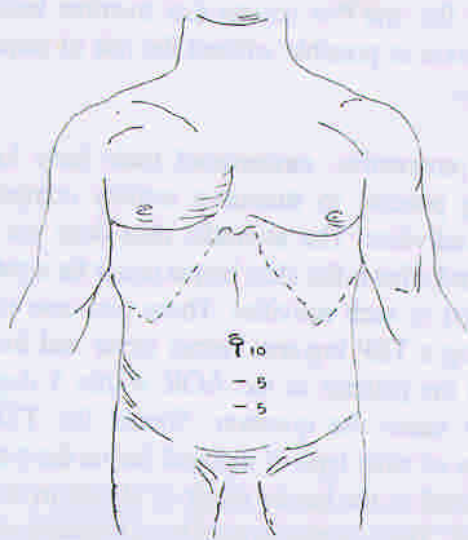


Fig. 1.

Under direct vision two 5 mm trocars were placed in the lower midline (Figure 1). Laparoscopic graspers were used to dissect and identify Cooper's Ligament. The direct and femoral spaces were inspected. The lateral aspect of the abdominal wall was bluntly dissected to the level of the anterior superior iliac spine (ASIS). The indirect hernia sac (Figure 2) was retracted from the inguinal canal revealing the abdominal wall defect and separated off the spermatic cord (Figure 3). The hernia sac was then pulled cephalad until the posterior peritoneal edge was brought to the level of the ASIS.

A 5-x 4 inch sheet of polypropylene mesh was advanced into the created space through the 10 mm trocar. The mesh was unfolded and laid over the cord structures covering the myopectineal orifice. Staple fixation was performed. Operative times were the same, 1 hour and 45 minutes.

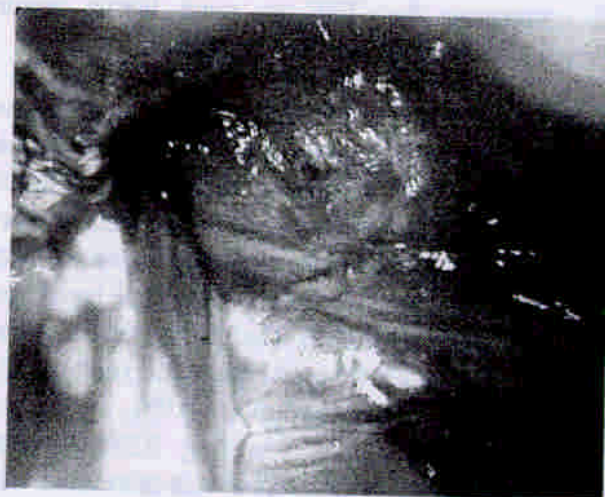


Fig 2.



Fig 3.

Discussion

Before laparoscopic herniorrhaphy could be considered a viable alternative to the open technique, its efficacy and safety had to be evaluated. A multicenter Phase II trial was undertaken in 19 institutions. Three different types of laparoscopic inguinal herniorrhaphy techniques were studied: the transabdominal preperitoneal intracorporeal, on-lay mesh, and the TEP. There were 39 recurrences in 867 hernias repaired laparoscopically, for a recurrence rate of 4.5%. No recurrences were identified in the 87 TEP repairs. Complications related to laparoscopy occurred in 5.4% of patients and 17.1% to the herniorrhaphy itself. The conclusions of this trial was that laparoscopic inguinal herniorrhaphy is an effective method to correct an inguinal hernia and the early failure rate is low.³ Efficacy was also determined for a 5-year follow-up

period comparing the TEP to open hernia repair. Recurrence rates were similar for both groups.⁵

Postoperative pain and return to normal activity have been studied when comparing open versus laparoscopic repairs.⁶⁻¹¹ Sarli et al compared laparoscopic bilateral inguinal hernia repair versus the open Lichtenstein tension-free hernioplasty.⁶ The intensity of postoperative pain was greater in the open hernia group at 24 hours, 48 hours, and 7 days after surgery ($P<0.001$). The median time to return to work was 30 days for the open repair group and 16 days for the laparoscopic repair group ($P<0.05$). Two meta-analyses looked at studies involving 9,275 patients. Laparoscopic inguinal hernia repair was associated with less postoperative pain and more rapid return to normal activities.^{7,8}

The TEP versus open repair was compared on a group of active duty U.S. Air Force patients.¹⁰ The open group returned to work at 11.5 days and to full activity at 26.7 days. The TEP group returned to work at 6.4 days and to full activity at 14.2 days ($P<0.001$ for both data). The TEP group reported better functional status at 2 weeks than the open group. At 6 weeks, this difference was no longer statistically significant.

Quicker return to normal activity as a study variable has been measured subjectively. Rosen et al validated this hypothesis with objective data.¹¹ Patients completed a 6-minute walking test preoperatively and 1 week postoperatively using a nonmotorized treadmill. At 1 week, patients who underwent laparoscopic repair demonstrated a mean increase of 18 meters from preoperative distance ($P=0.07$). In the open group, patients demonstrated a mean decrease of 90 meters at 1 week ($P=0.001$). The change in distance at 1 week between the laparoscopic and the open groups was statistically significant ($P=0.001$). Laparoscopic repair offered an early advantage to open repair.

Regulations do not exist in the military in regards to what hernia repair must be performed and how long the convalescence will be. The individual surgeon determines these. If the goal is to return the active duty member back to full duty as soon as possible, then the hernia repair that offers this should be performed. This gives a new meaning to preserving the fighting strength of the military. The literature suggests laparoscopic inguinal hernia repair fulfills this.

Returning a patient to normal activity in the civilian arena is not the same as returning a patient to wartime activities. The stressors of war are much more strenuous than that required of most civilian jobs. Sleep deprivation, severe and quick changes in climate, operating at high altitudes, and prolonged marches with a 70 kilogram rucksack are a few examples. If an active duty member were to undergo a hernia repair and be returned prematurely to duty, their performance would suffer and jeopardize the safety of that member and his team. If an active duty member needs to be evacuated out of the AOR and requires an operation, then the operation performed should be the one that returns that member back to the AOR as soon as possible without the risk of jeopardizing their safety.

No prospective, randomized trials have looked at subjecting patients to strenuous activity comparable to wartime activities. The scientific data does not exist to recommend what is the ideal hernia repair for a patient that is involved in such activities. These two case reports of performing a TEP inguinal hernia repair and then safely returning the patients to the AOR within 5 days of the operation raises the question: Should the TEP repair, regardless of what type of inguinal hernia the patient has, be mandated as the hernia repair of choice in active duty members? This question would have to be answered by a controlled, randomized trial looking at subjecting patients to very strenuous activity after a laparoscopic hernia repair. Therefore, it is very unlikely that a study of this type would be undertaken. The data and results of prior studies can only be extrapolated and applied to patients involved in wartime activities.

Conclusion

Laparoscopic inguinal hernia repairs have been shown to return a patient more rapidly to activity. Two patients at LRMC underwent the TEP repair and were returned to duty involving wartime activities. The TEP repair performed at LRMC has been safely applied in the care of patients involved in OEF.

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Landstuhl Regional Medical Center (LRMC) is the largest U.S. military medical facility overseas and is located in the heart of Europe in the town of Landstuhl. The LRMC is a 1,200-bed facility that provides medical care to U.S. military personnel and their families. The LRMC is also a teaching hospital and is affiliated with the University of Maryland School of Medicine. The LRMC is a member of the American Medical Association and the American College of Surgeons. The LRMC is a leader in the field of military medicine and is a proud member of the Landstuhl Regional Medical Center family.

Medical Response to the Threat of Bioterrorism: Anthrax and Other Concerns

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Background

A tracking and reporting process to monitor and control reported suspect exposures to biological terrorism (BT) agents (for example, *Bacillus (B) anthracis*) was instituted at the European Regional Medical Command (ERMC) in the wake of the massive terrorist attacks and destruction of the World Trade Center Towers (WTC), in Manhattan, 11 Sep 01. The fear of further devastating terrorist attacks on the American people, including BT, was heightened in American society, stimulated by media reports. The U.S. military, actively involved in war against known terrorist organizations, became acutely aware of the need to protect its own forces. The media was focusing on the war against terrorism and the search for the prime organizer of the attacks, Osama Bin Ladin.

In this context, anticipation of possible and likely terrorist targets, weapons, and methods became part of the mind-set in the military, the media, and society at large. Reports of anthrax fatalities in urban centers as a result of BT in the U.S. increased the awareness of the vulnerability to the dreaded threat of biological attacks in the American psyche.¹ The first cases of feared exposure to biological warfare agents, in the form of "white powder" found in the mail system, presented in the European theater military community in mid-Oct 01, barely a month after the 11 Sep attacks.

Landstuhl Regional Medical Center (LRMC) is the largest U.S. military medical facility overseas and as such, the key leader in organization and delivery of medical services for U.S. forces in Europe, in the Near and Middle East, and in Africa. The leadership of LRMC took responsibility for devising and implementing a tracking mechanism to record and follow all suspected exposures to possible BT agents; this program was expanded to the entire European Medical Command. This task required

coordination with involved medical providers, military and local national police, and military and local national laboratories taking part in the process of diagnosing, managing, and treating all patients subject to suspected BT agent exposure in its theater of medical operations.

The main objective was to prevent harm and possible death to U.S. service members, civilian employees, and their family dependents as the result of possible exposure to terrorist attacks with BT agents, particularly *B anthracis*, and obtain verification of suspected exposures. Furthermore, the gathering and analyzing of pertinent data on reported suspect BT exposures could lead to better understanding of the magnitude of the BT threat and modus operandus of perpetrating terrorists. This could further result in increased medical capability to implement a better preparedness plan for responding to both the infectious diseases risk and the psychological threat to the effectiveness of American forces in their war against terror.

As the first patient suspecting exposure presented to medical facilities, principally to LRMC, the hospital command authorities, under the leadership of the Hospital Commander and the Deputy Commander for Clinical Services (DCCS), intervened by planning an organized response. A physician was given the role of Biological Warfare Officer (BWO), with responsibility for developing and coordinating an Anthrax Tracking Program to deal with this new terrorist threat.

Meetings were held involving personnel and authorities representing a variety of professions and disciplines and representing both LRMC and the local German community of Landstuhl and surrounding areas. During the initial organizational meetings, the hospital was represented by the Commander, the DCCS, the hospital emergency room (ER), infectious diseases (ID), Medical

Laboratory Services, Preventive Medicine, Environmental Care, the Infection Control Program, the Department of Nursing, military police, and the hospital Fire Department. The local community expressed its concerns and wishes to cooperate with the U.S. military health care system in its usual supportive, integrative, and friendly fashion. They sent representation from the office of the Mayor of Landstuhl, the Fire and Police Department, and ID and microbiology faculty from Saarland University Hospital.

The process that ensued empowered the development of access, compilation, coordination, and information management to deal proactively with all BT suspect exposure reports. It allowed the LRMHC health care system to deal with all patients who presented to its theater of operations since the first case who came to the LRMHC ER on 14 Oct 01.

Methods

Information Gathering, Tracking, and Management Process.

Preventive Medicine organized a referral process for all patients with potential exposures to BT agents. An algorithm for clinicians based on Center for Disease Control and Prevention (CDC) guidance, military medical guidelines and consensus-based recommendations for civilian biodefense was distributed to all ERMHC medical facilities.¹⁻¹⁰ This algorithm gave explicit guidance regarding notification of law enforcement agencies and rational advice de-emphasizing the role of patient decontamination. Clinicians were given the option to obtain nasal swab cultures (NSC) and to prescribe a 3- to 7-day course of postexposure prophylaxis, if the threat was considered credible by the attending physician, or by law enforcement of public health risk assessment.

Patients were provided with information sheets addressing frequently asked questions about anthrax and bioterrorism. The attending physician was to send a Medical Consult to the BWO for all patients suspected of having a BT agent exposure.

The BWO was to receive all Medical Consults via the ERMHC medical computer system (Composite Health Care System [CHCS]) and organize a program for registration, management, oversight, follow-up, and case

reporting to Preventive Medicine. The consults came from ER facilities within the ERMHC organization in the European theater. These included U.S. military medical facilities in Germany, Belgium, and Italy.

The BWO was also to track all reported patients to ensure that a diagnosis was clearly and definitively determined, and treatment properly conducted and adhered to by the patient, to guarantee maximum protection.

In practice, when a patient with suspected *B anthracis* exposure initially presented to the ERMHC medical system, the following occurred:

- The patient was evaluated and treated by the ER or clinic where he or she presented.
- The ER provider entered a Biological Warfare Consult (BWC) in the CHCS system.
- The BWC was automatically received by the BWO.
- The BWO acknowledged receipt of the BWC in CHCS and proceeded to gather pertinent information and enter it into the Anthrax Tracking Report (ATR).
- The BWO then checked every individual patient entry and coordinated with the appropriate sources of information:
 - The referring provider, to verify medical and referral information, as needed.
 - Military and/or local police for results of forensic tests performed on field collected samples, as needed. Forensic reports were made provisional within 24 hours and definitive after 5 days of filed sample collection.
 - The medical laboratories within the ERMHC or in the local national laboratories, to verify test results. The NSCs were done for epidemiologic surveillance rather than for clinical diagnosis; if one NSC from an incident tested positive, a full course of prophylaxis would be advised for all those involved in the incident (a clinical decision to extend prophylaxis for a specific individual following a confirmed exposure incident would not be based on the individual's NSC result). Typically, these results were reported as preliminary in 24 hours and final

within 72 hours. Laboratories at outlying facilities performed preliminary screening tests (Level A); the LPMC microbiology laboratory performed confirmatory tests on suspected isolates. The LPMC microbiology is equipped as a Level B laboratory, comparable to a state health department laboratory, and has Biosafety Level 3 capability.

- Ultimately, the BWO ensured patient notification once definitive results were obtained. Prophylaxis was to be extended for a full 60-day course if *B anthracis* exposure was confirmed by analysis of suspect powders or other environmental samples, or by a positive NSC from any individual in a given exposure incident.

The ATR was created for documentation and tracking purposes. The BWO was responsible for maintaining this table and for using it as the basis for his periodic report to the LPMC DCCS and to Medical Headquarters in Heidelberg, Germany (ERMC). Below are the column headings of the ATR: (1) *Patient No., Last Name-First-MI, SSN/ID, Tel No., and Comments*; (2) *Incident Date, Date Patient Examined, Practitioner, MTF Where PT was Examined, and Lab Test Ordered*; (3) *Lab Test Result, Lab Test Result Date, Result to PT Date, Prophylactic Treatment AMT, and Prophylaxis Start Date*; (4) *Prophylaxis End Date, Treatment F/U Drug AMT/Date, Forensic Test Result, and Forensic Test Result Date*.

Findings

Seventy-three patients presented to ERs at LPMC, Vicenza (Italy), NATO Clinic (Belgium), or to the SHAPE Clinic (Belgium).

Number of patients presenting to LPMC ER facilities:

LRMC	VICENZA	NATO	SHAPE	TOTAL
51	4	4	14	73

Number of patients presenting to LPMC ER facilities each month from Oct 01 through Apr 02:

Oct	Nov	Dec	Jan	Feb	Mar	Apr
19	34	2	5	1	2	10

Seven incidents, involving 11 patients, were investigated without field-testing of environmental specimens. In all other incidents, powders were field-tested for *B anthracis* and sent for further laboratory testing. All specimens tested negative for *B anthracis*.

Sixty-eight of the 73 patients had NSCs. All were negative for *B anthracis*. Four patients, Tracking Report Numbers 16 through 19, were exposed to a suspicious substance in the U.S. They presented to the NATO Clinic in Belgium for follow-up.

The NSC of potentially exposed individuals:

Number of Patients Tested	Not Tested
68	5

The decision to begin or to withhold prophylaxis pending the results of culture results was made by the ER physician on the basis of information obtained from law enforcement.

Number of patients begun on postexposure antibiotic prophylaxis:

Number of Patients on Prophylactic Antibiotics	Not Treated
21	52

Number of patients prescribed specific prophylactic agents:

Doxycycline 100 mg	Ciprofloxacin 500 mg	PEN VK 250 mg
7	13	1

All prophylactic treatments consisted of twice-a-day oral doses prescribed for 5-day courses. Since all forensic and medical laboratory tests results were negative, no patient required a full 60-day course.

Other aspects of the program included risk communication to the population at large and medical personnel. These efforts included material for the Stars and Stripes newspaper and Armed Forces Network (AFN) television, a 1 hour call-in program on AFN radio, and

focused briefings for postal workers (the occupational group at highest risk and school psychologists and counselors.¹¹ Briefings on the medical and psychological aspects of biological and chemical terrorism were conducted for the medical and allied professional staff at LRMC, and telecast to affiliated clinics.

Conclusions

A comprehensive program integrating law enforcement, public health, laboratory and medical assets was developed to address the threat of bioterrorism. The goals of the program were to identify a population at risk, to enhance tracking, prophylactic therapy, and follow-up of potentially exposed individuals. A total of 73 patients presented to ERs at LRMC and associated clinics in the European medical theater of operations during the 6-month period of mid-Oct 01 to mid-Apr 02 for suspected biological agent exposures. Twenty-six percent of all cases presented in October, 46% in November, 14% in April, 7% in January, and the remaining 7% came in December, February, and March. Although all patients were exposed to "a suspicious white powder" and feared *B anthracis* exposure, all cultures of environmental samples (88%) and NSCs (performed on 91% of patients) were negative. The decision to begin or withhold empiric prophylaxis is influenced by the probability of exposure, based on the circumstances of the exposure (package with threatening letter and powder, vs contact with an unknown powder in a public place), and information from law enforcement agencies regarding threat assessment. The results of rapid field tests for environmental specimens must be confirmed by conventional culture methods; the results of rapid tests should not be used as a basis for clinical decisions.¹²

This program serves as a template for multidisciplinary coordination, utilizing a computerized record system of a large medical system to optimize patient tracking and follow-up after potential exposures to biological agents. Such a program is essential to execute decisions to initiate, extend, or terminate postexposure prophylaxis, and to monitor compliance and outcome.

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Chaplains and the Spiritual Needs of Patients and Staff

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This article presents the Chaplaincy's Pastoral Services role at Landstuhl Regional Medical Center (LRMC) since 11 Sept 01 and the beginning of Operation Enduring Freedom (OEF). The Unit Ministry Team (UMT) of LRMC, to include volunteers, has addressed the spiritual needs of more than 800 OEF patients. We have also provided ministry to the regular daily patient census of 75-100, as well as a hospital staff comprised of Army, Air Force, and Navy personnel as well as civilians. The primary role of the Pastoral Services Department has been to provide spiritual leadership in addressing the religious needs of patients and staff, thus enhancing a strong foundation for a holistic approach to health care among all providers.

Press reports often refer to those wounded in OEF as receiving medical care in "the American hospital in Germany." The LRMC is that hospital, located halfway between the current battlefield and the United States. We take our mission statement seriously, that of serving as "A beacon of health care for America's sons and daughters abroad." The UMT has also been a beacon of light in addressing the spiritual needs of America's sons and daughters serving abroad and fighting the war on terrorism. Words cannot express the feelings many of the sick, wounded, and injured experience upon their arrival to LRMC's emergency room. Commonly heard expressions include, *"I feel like I am almost home."* *"It is good to understand the language."* *"It's great to have a hot meal."* *"When can I call home?"* Even though Landstuhl is not "America," it does offer a sense of home, a feeling of hope, the promise of healing, and the safety of security. All of these factors play a role in the physical, mental, emotional, and spiritual journey that must be traveled through the healing process.

The LRMC UMT has been guided by the key values identified by the Chief of Army Chaplains:

- Spirituality: Seek to know God and yourself at the deepest level.
- Accountability: Hold yourself and others to the moral and spiritual high ground in every area of life.
- Compassion: Love in word and deed.
- Religious Leadership: Model spiritual truths wisely and courageously.
- Excellence: Do your best for God's glory.
- Diversity: Respect the differences of others.

Our lives have been, and continue to be, painfully affected and challenged by the feelings and events resulting from the atrocity of 11 Sep, the initiation of the War on Terrorism, and OEF. These events have called for courage in the midst of chaos and darkness that appears, at times, to envelope the world. There are few people for whom the events of 11 Sep carry little meaning – that day will be etched forever upon our lives, changing how we view ourselves, our nation, and the world. This is where our sacred values come into play.

The first value is that of Spirituality. This is where we seek to know God and ourselves at the deepest level, realizing that spirituality is an integral component of our basic foundation. With an understanding of our own spirituality, the UMT sought to provide an environment in which OEF patients could rely upon their own spirituality to help them through these difficult times. Not surprisingly, many of them had questions – about their roles in the military, their performance under fire, and their survival amid the deaths of colleagues. When presented with these questions about life and the meaning of existence, we walked with them on their journey to understanding and acceptance. Chaplains understand the dual nature of a

human being, recognizing that one's constitution is both physical and spiritual. For a person to be "whole" and "well," both these dimensions need to be addressed. In fact, there is a growing library of research attesting to the healing powers associated with meeting the spiritual needs of patients. Our patients arrived with a myriad of injuries and illnesses – they also represented the spectrum of religious faiths. Just as the provision of medical care has required on-going coordination within a multidisciplinary and collaborative environment, addressing their spiritual needs has required continual support and cooperation from chaplains through the European Command. Our success in this mission has resulted in the provision of the best possible care for our military members and their families.

The second sacred value is that of Accountability. We hold ourselves and others to the moral and spiritual high ground in every area of life. General Douglas MacArthur said, *"The soldier, above all other men (and women) is required to perform the highest act of religious teaching – sacrifice. In battle and in the face of danger and death he (she) discloses those divine attributes which the Maker gave when He created man in His own image. No physical courage and no brute instincts can take the place of the divine annunciation and spiritual uplift which alone will sustain him."* The UMT understands this spiritual high ground. We understand the sacredness of life and the need to treat all individuals with dignity. We understand the moral imperative to treat others as we would want to be treated. With that mandate, we have ministered to each soldier and their family members, regardless of the severity of their injuries or the intensity of their needs. Not only have we held each other accountable for the level of ministry to our injured, but the UMT has served as an active advocate for OEF patients, ensuring that their needs are met by LRMC as well as their respective military services. The UMT, along with the staff of LRMC, has demanded excellence from ourselves in serving the needs of these warriors, these heroes of our nation. This standard has required us to frequently "think out of the box." As they transition from the battlefield to the continental United States (CONUS), the soldiers, sailors, airmen, and marines treated through LRMC have presented us with numerous challenges. A significant proportion required only outpatient services – however, many arrived with minimal clothing, which often proved inadequate for the German climate. In addition to the issue of civilian clothing, the need to replace military uniforms was a significant issue – many of the patients spoke to the

importance of returning home as warriors. Lodging – for both patients as well as family members coming over to be with loved ones – was at a premium at times, and financial needs for the patients and their families presented another issue upon occasion. In close coordination with the Red Cross, USO, Army Emergency Relief, Social Services, the Fischer House, and other agencies, the UMT strived to ensure warrior's needs were met.

The third sacred value is Compassion. Compassion involves love in word and deed. The UMT is "on the ground" at the emergency room when sick and injured military members arrive from Ramstein Air Base. We meet, greet, and listen to every patient, including the "walking wounded," regardless of the day or hour. In addition to this ministry, our interventions have included lifting litter patients onto gurneys, pushing wheelchairs, and accompanying patients to their rooms; we also ensured that drinks, snacks, and meals were available for patients as well as attending medical personnel. While respecting their personal space, asking the patients about their religious and spiritual requests during these interactions allows for the effective provision and accommodation for these needs. We also believe it is important for them to tell their stories when they are ready, and offer a willing and ready ear. Our goal is to ensure all the necessary resources are identified and utilized for the benefit of the wounded and their family members. To that end, team meetings and debriefings are used to assess the stress and trauma of everyone's experience, to include patients, family members, and staff. This ministry of presence is not a trite concept. By meeting all OEF patients when they arrive at LRMC, we offer a comfortable environment, a sense of hope, and peace in the midst of trauma and chaos. By addressing the needs of the care providers, we ensure that the staff continues to be capable of providing competent and compassionate service. We continue to follow our OEF patients through-out their stay, offering the prophetic ministry of our own tradition – when patients have a different faith, we actively seek someone within their tradition to meet their spiritual needs. We know that the words of their tradition bring comfort and solace to their souls, enhancing their recovery. Here are a few of the religious scriptures and thoughts from various faith groups that focus on the light that many seek during such dark and difficult times:

– "The Lord is my light; whom shall I fear?"
(Judaism)

- "In the lotus of the heart dwells Brahman the Light of lights" (Hinduism)
- "The Light of Divine Amaterasu shines forever" (Shinto)
- "Following the light, the sage takes care of all" (Taoism)
- "The radiance of Buddha shines ceaselessly" (Buddhism)
- "I have come into the world as light" (Christianity)
- "Allah is the Light of the heavens and the earth" (Islam)
- "God, being Truth, is the one Light of all" (Sikhism)
- "God is the sun beaming light everywhere" (Native African)
- "The light of Wakan-Tanka is upon my people" (Native American)

The UMT at LRMC takes very seriously its obligation to this sacred value of compassion. The following serve as examples of this ministry to our OEF patients: (1) One of our OEF patients was severely injured and not expected to live through the night. I, along with another chaplain, visited the patient, several family members, and members of his command. We read from the Scriptures since the patient and his family came from the Christian tradition. We also had a season of prayer together. While I comforted the wife, the other chaplain went with the patient's brother to call the patient's mother who was still in the States. The chaplain spoke with the mother, who was also a Christian, ending the conversation with prayer over the telephone. The chaplains were there when the service member was taken off life support and continued to minister to family members over the next several days. A member of the UMT attended the ceremony in which the soldier's wife received her husband's Purple Heart. The UMT also coordinated with the soldier's unit chaplain in CONUS to ensure continuity of pastoral care when the wife returned home. (2) Another OEF patient came to us with a combat injury to one of his

limbs. While describing his experience with one of the chaplains, including his thoughts and feelings about coming close to dying on the battlefield, the soldier broke down and cried, the first time he had expressed those emotions. He came from a unit and culture that he perceived would frown on such a display. Now believing he was in a safe place and could be honest about his feelings, he freely shared his fears, his concerns, and his needs. He realized that we were there not to judge him, but to help him. (3) On another occasion, several pilots were transferred to LRMC after their aircraft crashed due to mechanical problems. Both were severely injured, but the ministry of the UMT lifted their spirits and enhanced their recovery. Both were delighted to see the chaplains. One of the pilots had some difficulty reading, due to his injuries, so he loved it when the chaplains read Scripture and prayed with him. The other pilot burst into tears during our visit as we talked, read the Bible, and prayed together. His countenance was lifted up and we could see hope being restored to that individual. We also ministered to their family members as they arrived to be with their loved ones. It was great to be a part of the team effort in taking care of these dedicated soldiers. The doctors, nurses, and the technicians used their expertise to minister to the broken bodies and the UMT, fulfilling their calling, ministered to the souls of these soldiers. (4) The UMT also initiated a ministry of hospitality to some of the patients, inviting them out for meals and, on occasion, taking them into our homes. Some of the flight crews, those that continually bring in the sick and injured, were also extended like hospitality, especially during the holiday season. (5) This is the reflection of a Chaplain who provided religious support in honor of seven Marines who died in OEF. *"The second Sunday of January 2002 will always be in my mind. Earlier that week I heard about a KC-130 plane crash that killed seven Marines during a refueling mission in Pakistan. Little did I know that I would receive a call to participate in a flight line ceremony, and considered it an honor to be able to help in any way. In a cold warehouse at Ramstein Air Base, a platoon of U.S. Army soldiers, two squads of U.S. Marine pall bearers, and a Chaplain spent hours rehearsing the ceremony to offload the remains of these fallen service members and load them onto the aircraft returning them home. As the arrival time neared, the team assembled along the flight line waiting patiently in the cold and fog to perform this mission of honor. However, due to inclement weather the aircraft was diverted. Without grumbling or*

complaint, the team quietly boarded buses to make the 90-minute journey to Rhein-Mein Air Base. As the aircraft arrived, the team reassembled along the flight line under the canopy of a dark, frigid night. With my Bible in my hand, I dawned my stole, a sure and certain sign for me of the Resurrection and assurance of God's presence, as I was about to march once again through the Valley of the Shadow of Death. I said a short prayer and proceeded up the ramp of the C-17 with the mortuary affairs officer. The rows of flag-draped coffins left a lump in my throat. As I saluted, I thought how these flags would make a journey thousands of miles home, be folded into a triangle, and presented to their families on behalf of the President and a grateful nation. I moved among each of the coffins, blessed the fallen Marines, and said a prayer commending them to our Creator and Redeemer. With great dignity and reverence, the pall bearers carried the caskets containing the dead Marines out of the aircraft and escorted them onto the C-5 that would take them home. I read words of hope from Holy Scripture as I followed behind. I will be forever moved by the sacrifice of these seven Marines, the professionalism of the team that I had been with all day, and the scores of airmen and civilians that took a moment to pause from their duties to render honors and salute each of the seven Marines that gave their lives in defense of our Constitution."

A fourth sacred value is that of Religious Leadership. Our intent has been to model spiritual truths before LRMC's staff and patients. Every faith group has had great leaders of the faith, with such leaders found in every age as well. God raises up such leaders, especially during times of crisis. Our nation finds itself in such a crisis now. We are under attack by forces that would want to destroy our way of life and along with it, the liberties that we enjoy as a free people. One of those liberties is the right to freely congregate with the express intent to worship. Another includes ensuring the dignity of all men as created in the image of God. The right to life, the right to liberty and, within liberty, the right to worship freely, and the right to pursue happiness are rights that come down from the "father of lights." In this sense, our religious leadership has been very intentional and directed to both patients and staff. By being faithful to our traditions, we have sought to be people of the word and people of prayer. To that end, we have sought to be a nonanxious presence to those who we come into contact with. We pray for patients and staff alike. We listen to patients and staff. We are a safe place

for both. We desire to be a bastion of strength and to bring peace in the midst of the storm. To help deal with the aftermath of 11 Sep attacks on our country and the devastation we incurred, the UMT has taken the lead and has been an integral part in Commemoration and Prayer Services. We were an integral part of the Commemoration Services held after the initial tragedy on 11 Sep as well as the 1-year anniversary. We lead off morning staff meetings with a devotion and prayer. We are involved in all the multidisciplinary meetings involving the care for these patients, and provide a daily devotional for all the European Regional Medical Command. Our religious leadership can be witnessed in our words and deeds.

A fifth sacred value is that of Excellence, a tenet that is found in all major faith groups. The UMT has been determined to carry out our religious duties with excellence. We want to be true to our traditions while serving in a pluralistic environment. We want to be able to articulate our faith in an understandable way and to provide for the needs of other faith groups. We want to be people with a deep and abiding prayer life. We want to be known as people who are committed to their faith. We also recognize that we are both religious leaders and military officers with staff responsibilities as well. We have been and are fully engaged with the staff in planning together for critical, holistic health care. Our involvement in this process, along with our commitment to excellence, has only enhanced the total and seamless health care required for sustainment in this critical environment. We have striven to make the most of every moment, especially during OEF, and to seize every opportunity to serve God and our nation, and to use every available resource to that end. Excellence is not optional for the UMT – it is essential for the well-being of our military personnel and their families.

The last sacred value that has characterized our efforts in OEF is that of Diversity. We have demonstrated our commitment to respect the differences of others. From the battlefield to LRMC's the hospital rooms, all service members are provided religious support. Identification of and coordination with various faith group chaplains and representatives ensures that patients' requests for particular faith group requirements are met. Thankfully, we have been able to provide religious support because of the diversity of faith groups represented in our area. We have

provided support and coordination for religious services with Afghani, Canadian, Swedish, Australian, New Zealander, and British patients in addition to our own American military. Our UMT works hard to identify and facilitate various kinds of unity in our spiritual diversity. We look for ways to work together and accommodate spiritual needs, both individually and collectively. We are intentional in our efforts to learn and appreciate our religious and cultural differences. We share through spiritual observances, memorial events, small group gatherings, and internet publication of a "daily thought" the ideals that unite, inspire, encourage, and enhance our coping and caring skills.

When everything seems dark and dangerous, we look for someone in whom to place our trust. From Old Testament times to the present, the role of the Chaplain, a noncombatant in the combat environment, is to share the presence of God through word and deed with the people of God. In times of fear, turmoil, trouble, and uncertainty, we often look for spiritual connectedness. Realizing that people will often turn to spiritual resources during illness, uncertainty, and other painful experiences, we offer the spiritual resources of various faith groups as a helpful, coping, and nurturing process. The more tragic the events, the more intense and demanding are the questions and requests the chaplains receive. But in all cases, we assume and listen for the hurt of separation and fear as a result of war. Where do we find the power to "hang in there" in this kind of world? Where do we find the stamina to continue to smile, to laugh, to dream, and to believe in a world that is bruised by hate? We find it in the celebration of new life, warm smiles, love expressed by family and friends when comforting each other and saying, *"It's going to be all right."* We see the power of good in a world that is suffering when we see people singing songs of hope and joy. Throughout our daily work, in moments of holy pride and high moments of resonance, we experience an unleashing and releasing of energy. Being keenly aware of problems and difficulties that we face with the wounded, sick, and dying placed against the backdrop of national fear and insecurity, we know we must be intentional about celebrating the joys and accomplishments of those around us. We must express gratitude for the courage and the value of a resilient spirit. *"No sane man is unafraid in battle, but discipline produces in him a form of vicarious courage,"* said George S. Patton. We grew tremendously this year and we will continue to grow. We have seen the

worst in people and we have seen the best. We have balanced the sorrow with the sweetness of life. We shared our burdens and celebrations, sometimes with sadness and at other times with laughter, gaining a new appreciation for life and its meaning, purpose, and relationship to the world in which we live. William Faulkner stated *"I believe that man will not merely endure. He will prevail. He is immortal not because he alone among creatures has an exhaustible voice, but because he has a soul, a spirit capable of compassion and sacrifice and endurance."*

The Army Chaplaincy calls the ministry team to religious leadership for the Army and "to be courageous in spirit and compassionate in service." In the year since 11 Sep 01, we have seen the heartbreak, fear, pain, and sorrow of war. We have ministered to the patients, families, staff, and one another here at LRMC. We have seen the victims and casualties of friendly fire, we have prayed with and for the Afghani soldiers in our hospital. (See photo with Chaplains and Afghan patients.) We have had Jewish, Islamic, and Christian chaplains ministering and praying together. Our doctors, our nurses, our administrative staff, our technicians, our volunteers, and our families serve together in one mission – to provide a compassionate military health care system led by a competent values-driven team ensuring informed healthy communities. This is holistic health care that provides for the spiritual needs of body, mind, and soul. On the battlefields, in the homes, and in the hospitals, we will continue to work together with all those who suffer as a result of the attacks of 11 Sep and the War on Terrorism to provide for the spiritual needs of the soul as well as the needs of body and mind.



"The soldier's heart, the soldier's spirit, the soldier's soul, are everything. Unless the soldier's soul sustains him, he cannot be relied on and will fail himself and his command and his country in the end. It is not enough to fight. It is the spirit which we bring to the fight that decides the issue...It is staying power, the spirit which endures in the end...the will to win."

General George C. Marshall

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The Role of the Operational Physician in a Medical Center

MAJ Mark W. Burnett, MC, USA†

Introduction

The 11th of Sep started much as any other fall day at Landstuhl Regional Medical Center (LRMC). As the only remaining military medical center in Europe, LRMC serves in many roles; providing primary care for the largest American population outside of the U.S., serving as a referral center for smaller hospitals in Germany, Italy, and Belgium, and caring for medically evacuated patients from Europe and Africa. With the destruction of the World Trade Center Towers and the attack on the Pentagon came a great deal of uncertainty at LRMC in how the hospital was to be utilized, with the certainty of knowing that at some time America would be striking back.

Although situated within the European Command area of operations, LRMC had previously participated in the care of medically evacuated patients from the Central Command area of operations. During the Gulf War, hundreds of patients were cared for at LRMC, having been evacuated from Southwest Asia. As the hospital geared up for the eventual increase in patient flow, it was able to draw on the past experiences of many physicians, nurses, and administrators who had been previously stationed in Landstuhl during the Gulf War. This included watching a camcorder video of the hospital's preparations taken at the time. But this upcoming war was to be different in both its scope and execution.

The War Begins

The war in Afghanistan proved to be different in tactics as well as patient flow. Instead of the intense, short duration of high casualties seen in the Gulf War, the casualty flow from the outset was more commonly small numbers of patients with intermittent influxes of "high visibility/high press interest" patients such as those involved in the "friendly fire" incidents. Initially, the duties of organizing the care for the Operation Enduring Freedom (OEF) patients became the responsibility of the Deputy Commander for Clinical Services, but it became

apparent very early on in the conflict that this would be a full time job in itself. A decision was made to create a new position to help organize the care of the OEF patients, from before the point of entry into LRMC until either their subsequent medical evacuation to the U.S. for further care or return to duty.

A New Role

The changes in medicine since the Second World War have been dramatic; so too, have the changes in the technology supporting medicine. A World War II medic in the jungles of the Philippines might not know about his incoming patients until they were on top of his Aid Station. A medic in Vietnam may be able to receive some information about his incoming patients, but it was sure to lack specifics. As recently as the Gulf War, the health care providers at Landstuhl would only know that a plane would be arriving from the Gulf, but would have only rudimentary knowledge of the types of patients onboard.

The OEF gave the Air Force an opportunity to field the TRANSCOM Regulating and Command/Control Evacuation System (TRACE2S) for the first time. This secure system allows "downrange" providers an ability to input tremendous amounts of patient information, enabling the receiving hospital to prepare in advance for the arrival of casualties.

This system was the cornerstone for the LRMC Operational Physician and the newly created Deployed Warrior Medical Care Center (DWMCC) in their care of patients from the Enduring Freedom area of operations. An example would be as follows: a helicopter has a hard landing in Afghanistan, and the more seriously injured patients are stabilized and then sent on to a Forward Surgical Team for more definitive care. As the patients are being prepared for medical evacuation to the next echelon of care, data is input into the TRACE2S system concerning their history of injury and initial treatment, medications, and the last set of vital signs prior to medical

evacuation. This report would then be able to be accessed by the receiving hospital, and preparations made – often 12 to 14 hours in advance. In this manner, LPMC was able to forecast when large numbers of patients would arrive, and know what types of specialists and sub-specialists would need to be pulled away from their day-to-day jobs to care for Enduring Freedom patients. Before high census scheduled flights and mass casualty emergency evacuation flights, an ad-hoc group with representatives from command, surgery, the emergency department, radiology, nursing, patient administration, manpower pool, and the chaplain's office would meet to forecast demands on manpower, radiology, operating room beds, and bed space. It was the job of the Operational Physician to chair these meetings and make sure that the various parties knew of each other's possible constraints.

Patients would often be medically evacuated back to Landstuhl for care that was not emergent or urgent in nature. The role of the Operational Physician would be, in this case, to perform a screening examination to ensure that their condition had not deteriorated since their evacuation from Afghanistan. This was performed in a side waiting area off the main emergency room, so it would not create additional traffic in an often already busy emergency department. While patients were waiting to be screened, they would be put into the hospital's database, given a meal, and if desired, meet with the Chaplain. The on-call Operational Physician would then screen the patients and either call the on-call specialist for evaluation for admission, or set the evacuated patient up with an evaluation in clinic on the following day.

A final piece of the puzzle for the LPMC Operational Physician involved information management. Links were quickly set up over e-mail and telephone between LPMC and the various sites within the Enduring Freedom area of operations. An incredible amount of interest was generated, especially in the early stages in the war, to the

point where, in a 3-hour period, one of the LPMC general surgeons received 18 telephonic requests for information concerning a patient. To stem the overwhelming number of requests for information, which could not be verified as "need to know" over the phone, a daily patient list was generated and supplied electronically to the major commands involved so that they could be specifically updated on the status of their sick or wounded soldiers. This list included only patient initials and was encrypted to preserve patient confidentiality. Initially, the vast majority of patients evacuated to LPMC continued on to the continental United States, but over time, more patients were returned to duty. This necessitated including outpatients on the daily reports so that referring physicians downrange could inform commanders when their troops would be able to return to duty.

Summary

The events of 11 Sep and the ensuing OEF in Afghanistan quickly expanded LPMC's role in military operations. With this influx of patients and information from remote sites, the need for an Operational Physician was recognized. This physician would work to analyze patient information provided in advance by the TRACE2S system, would forecast hospital needs, screen patients as needed, and provide feedback to the referring physicians and the commands involved. We propose this as a model system that worked successfully to ensure the operational aspects of wartime care are not overlooked in a busy medical center.

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OEF In-Theater Evacuation

Maj Mark D. Ervin, MC, USAF†

Introduction

As soldiers, airmen, and sailors rushed to the Persian Gulf region prepared to participate in Operation Enduring Freedom (OEF), Army, Air Force, and Navy surgical teams deployed with them in order to provide lifesaving surgical care at numerous locations within the theater. As the theater matured, Army Forward Surgical Teams (FST), Air Force Expeditionary Medical Support (EMEDS) facilities, and Navy Shock Trauma Units provided surgical care for not only U.S. servicemen, but also for contractors and Allied personnel. This conflict may serve as the definitive test bed for new deployable surgical assets developed since the Persian Gulf War. Competing with the transport of beans and bullets, surgical supplies and the surgeons to apply them were felt by some to be delayed in arriving during the Persian Gulf War. The design and refinement of smaller, more focused surgical teams paid great dividends in getting surgical assets into location by the time OEF began generating casualties. Army FSTs were more common than Combat Support Hospitals. Small EMEDS-based teams replaced the Air Force Air Transportable Hospital of the past conflict.

Although primarily prepared to address traumatic injuries suffered from hostile actions; general surgeons also provided coverage for non-battle-related injuries and illnesses. Surgical treatment of common ailments such as appendicitis and cholecystitis occurred at many of these sites during the first 9 months of OEF. As the theater matured, a small number of these patients recovered at their surgery location, but the majority of patients undergoing surgery were evacuated out of theater soon after their procedures had been performed.

Nearly all evacuated patients from OEF were sent to Landstuhl Regional Medical Center (LRMC) for further care and final disposition. It is the largest U.S. hospital in the European Theater and the tertiary care referral center for both the European Command and Central Command personnel deployed for OEF. At LRMC, all postoperative general surgery patients were evaluated and cared for by

staff general surgeons prior to moving to their final destination.

Methods

At the onset of OEF, LRMC established the Deployed Warrior Medical Care Center (DWMCC). The DWMCC served as the administrative control point for all patients arriving from OEF. A physician attached to the DWMCC directed patients to the appropriate specialty and followed their progress through the system. Records of arrival dates, diagnosis, disposition and care provided at LRMC were maintained within the patient administration section.

As a number of cases of appendicitis and acute cholecystitis had been evacuated from OEF, staff surgeons at LRMC felt that reviewing patients with these diagnoses would provide the best database for this study. From DWMCC records, all patients evacuated with a diagnosis of appendicitis or biliary diseases were identified. All available records of the patients care at LRMC and in the theater of operations were assembled and data points collected. Sources of data included inpatient records, records from in theater facilities, patient phone interviews, clinic notes, and aeromedical evacuation documents. Patients with initial surgeries performed within a fixed facility were excluded from the study. Also, patients who had nonsurgical treatment in theater were excluded from the data collection. Where possible, data collected was compared to historical norms. This article will present an overview of the patients receiving surgical care in theater for abdominal non-battle-related surgical illnesses.

Certain hypotheses were made by surgeons at LRMC evaluating these postoperative patients and are addressed in this review. First, it was felt that the patients in deployed settings had longer periods between onset of symptoms and definitive surgical treatment possibly due to operational concerns and limited access to surgical evaluation. Second, it was believed that the number of early complications in this population was higher than

historical data would predict. Third, it was felt that aeromedical evacuations lasting over 6 hours were well tolerated by postoperative patients with minimal complications related to prolonged flight. Finally, despite being located in a forward-deployed location, these patients received appropriate and capable surgical care.

Results

Between 15 Oct 01 and 11 Jul 02, LRMC received a total of 638 patients evacuated from OEF. Upon their arrival at LRMC, 98 (15%) of these evacuated patients were evaluated by general surgeons. From review of patient records, 12 patients were identified as having diagnoses related to biliary dysfunction as the reason for their evacuation. Eight individuals were returned to the states for elective laparoscopic cholecystectomy. Two individuals received procedures at LRMC for intractable or frequent biliary colic. Only two of the patients sent to LRMC had undergone surgical treatment for acute cholecystitis at a deployed medical treatment facility (MTF).

Data concerning the presentation and treatment of these two patients was available for review from the deployed MTF. Both patients reported symptoms consistent with acute cholecystitis for a period of 10 days prior to reporting for surgical evaluation. Both patients underwent open cholecystectomy with findings of advanced acute cholecystitis. One patient had documented gram-negative rod sepsis pre-operatively, was treated with intravenous antibiotics, and had an uneventful recovery. He was transferred to LRMC on postoperative day number seven. The second patient had a severely gangrenous gallbladder requiring part of the wall to be left in situ and had a 750 cc intra-operative blood loss. The patient was evacuated to LRMC on postoperative day number three and tolerated the flight well on supplemental oxygen without any reports of desaturation in flight. This patient developed a large right reactive pleural effusion that required pleurocentesis early in the patient's admission to LRMC. This patient also reported a hernia at the operative site in a post discharge follow-up communication. During transportation through the aeromedical evacuation system, neither patient suffered any documented ill effect related to their prior surgery. Both were admitted to LRMC and evacuated to Walter Reed Army Medical Center 2 days later for further care (one on postoperative day five and the

other on postoperative day nine).

Review of the 98 general surgery patients transferred to LRMC from OEF revealed 14 patients that were identified as having undergone surgical treatment for acute appendicitis while in the theater of operations. One individual was removed from the data pool upon discovery that his surgery had been performed at an allied fixed MTF and not a deployed facility. The average age of the remaining patients was 28 years. Twelve males and one female were included in this group. Significant data from the patients preoperative and operative care at the in-theater facility along with data acquired from the aeromedical evacuation system and LRMC records were used to evaluate duration of symptoms, time to evacuations, military service providing care, and immediate postoperative course. When data was not available on a specific data point, the patient was not included in the calculations for that particular topic.

In 12 patients, the military service providing surgical care was identified. Three patients were treated at Air Force EMEDS facilities and nine patients were cared for by Army surgeons at Combat Support Hospitals or by FSTs. In 10 patients, the average time from onset of symptoms to surgical treatment was 2.4 days (Figure 1).

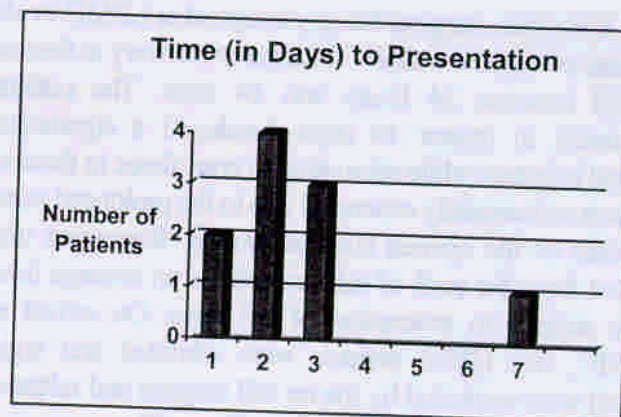
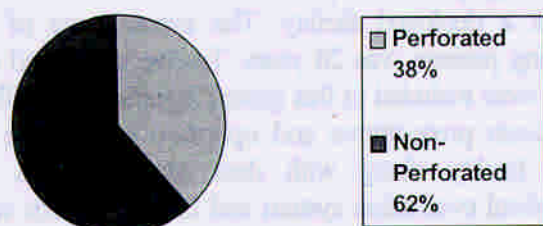


Fig 1.

The longest interval was a period of 7 days, with operative findings of perforated appendicitis and intra-abdominal abscess. This patient required a right hemicolectomy for definitive treatment. Five of the 13 patients (38%) had documented intra-operative findings of perforation of the appendix by the theater surgeon or pathology review of the specimen. One of these five patients had an unusual finding of a perforated appendix

residing in a patent right inguinal hernia sac that reportedly complicated the diagnosis of his illness. The average time from onset of symptoms to surgery was 3.5 days for the perforated group and 1.7 days in the nonperforated group (Figure 2).

Operative Diagnosis



Average Time (in Days) to Presentation

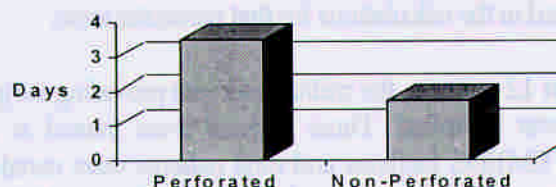


Fig 2.

Time from surgical therapy to arrival at LRMC in 10 patients averaged 4.4 days. The time of recovery in theater ranged between 24 hours and 14 days. The patient remaining in theater 14 days developed a significant wound infection while attempting to convalesce in theater. He was subsequently evacuated due to the prolonged need for care of the opened surgical wound. Removing this patient from the pool of subjects returns an average time from surgery to evacuation of 3.3 days. On arrival at LRMC, five (38%) patients were admitted and eight (62%) were evaluated by the on call surgeon and released to billeting for outpatient follow-up (Figure 3).

Disposition on Arrival to LRMC

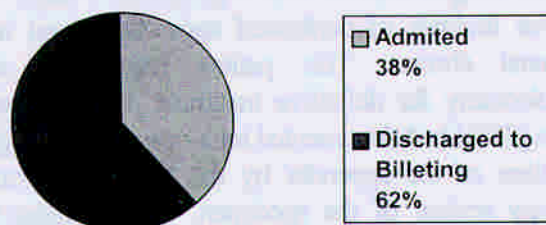


Fig 3.

Time (in Days) to Evacuation

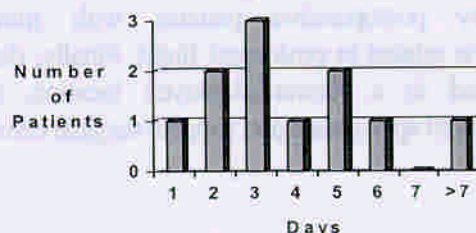


Fig 3. (cont).

Only two (13%) patients developed surgical complications post-operatively prior to discharge from care at LRMC. Both were wound infections that required opening and drainage in patients with perforated appendicitis (40% wound infection rate in this group [Figure 4]). One of the patients developing a postoperative wound infection had a pre-existing diagnosis of adult onset diabetes mellitus type II and required significant intervention controlling his hyperglycemic state post-operatively. His wound was opened at LRMC. The other patient arrived with his wound infection already addressed and required no further care at LRMC. There were no reports of intra-abdominal infections, pulmonary complications, or significant gastrointestinal complaints.

Post-Operative Complication Rate

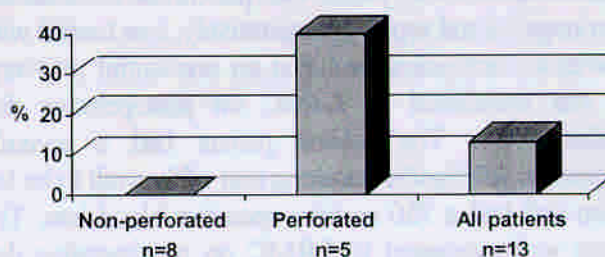
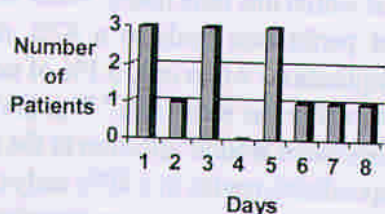


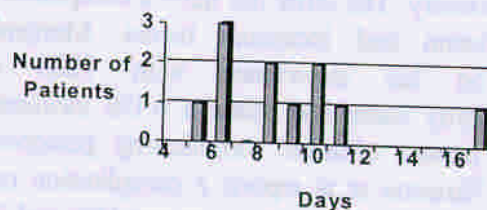
Fig 4.

All 13 patients were tolerating a regular diet, ambulating unassisted, and on oral pain medications at the time of discharge from LRMC. Two of the 13 patients were able to return to their duty station for further convalescence an average of 8 days after surgery. The other 11 patients returned to their home station for convalescence. Four patients were noted to have returned via the aeromedical evacuation system and seven traveled on commercial air carriers. There were no complications

Time to Discharge (in Days) from LPMC Care



Time (in Days) from Surgery to Discharge from LPMC



LPMC Disposition

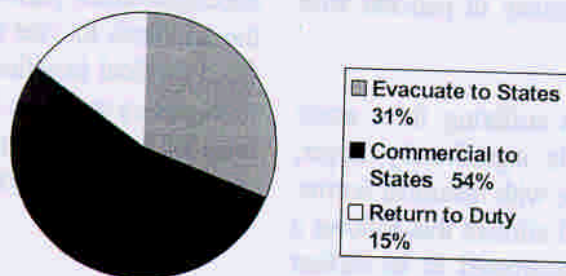


Fig 5.

reported associated with the patients' evacuation to their final destination. The mean time from performance of surgery to discharge from the LPMC medical system (inpatient and outpatient) was 9 days (Figure 5).

Discussion

During times of national conflict, military surgeons are sent to war to provide care for the ill and injured in an environment that can be challenging to surgeons accustomed to the comforts and stability of a fixed medical facility. Since the end of the Vietnam War, there have been few opportunities to test the capabilities of the U.S. military medical system to place a large number and wide range of surgical assets into an unfamiliar and hostile environment. The Gulf War saw a relatively slow arrival of surgical facilities in theater. Since then, the U.S. Army and Air Force have worked diligently to decrease the weight and volume requirements needed to deploy surgical assets. During OEF, the Army FSTs and Air Force EMEDS were tested by both traumatic and nontraumatic surgical pathology. This study chose to look at appendectomy and cholecystectomy, as they were the most common abdominal procedures performed for non-

traumatic general surgical illness. By comparing the data reported above to historical norms, one should be able to determine if the smaller surgical packages rose to the occasion in the care of their patients in the first few months of this conflict.

The treatment of acute cholecystitis in the deployed environment without access to laparoscopy would be expected to be different from that practiced in the fixed medical facilities stateside. There were a total of 12 patients sent to LPMC for biliary complaints of which only two had already undergone surgical therapy by the time of their arrival. Both of these individuals had prolonged courses of symptoms lasting 10 days. Intraoperative findings in one were severe enough to require incomplete removal of the gallbladder. This degree of disease would have led to a difficult procedure in any fixed facility. One question that cannot be answered in the scope of this study is whether the delay of treatment was related to operational requirements in a time of war, delay in patient initiated presentation, or missed diagnosis.

Both of these patients presented with advanced diseases (one with documented gram-negative rod sepsis)

and underwent a relatively major intra-abdominal surgical procedure in a field environment. One patient had an excellent recovery. The other did have a complication of pleural effusion and incisional hernia. Morgenstern reported on his experience with 1200 open cholecystectomy cases and states a 0.1% incidence of significant pleural effusion complicating postoperative recovery.¹ Simeone et al reports a complication rate in cases of gangrenous cholecystitis between 16% and 25%.² Although the group sample size is too small to make statistical evaluations as to outcomes, it does demonstrate the capability of the smaller surgical teams to perform major abdominal surgeries in seriously ill patients with acceptable results.

The study group of patients suffering from acute appendicitis treated downrange is significantly larger, allowing for better data to compare with historical norms. Appendicitis is a common surgical ailment that follows a rather predictable course. If not addressed in its earliest stages, the appendix will develop focal necrosis and perforate. Temple reviewed 95 consecutive adult patients undergoing surgery for presumed appendicitis and found 82% of patient with appendicitis in his study had nonperforated appendicitis and 18% had perforated appendicitis.³ Although not statistically significant due to the small numbers of patients, this study group appears to have had a greater incidence of perforation (38% for OEF vs 18% in Temple's paper). Temple's study found the most relevant predictor of perforation to be time from onset of symptoms to presentation at the MTF (22.22 hours for nonperforated vs 57.31 hours for perforated).³ Although the exact times between onset of symptoms and surgical treatment could not be collected as accurately in this study as Temple's, the 1.7 day interval for nonperforated patients and 3.5 day delay for perforated patients seen in this review is consistent with the historical findings. What remains unclear with this group is the reason for the apparent prolonged time of presentation after symptoms appear. Anecdotal reports from patients indicate that onset of early symptoms during missions may have had a role in some of the delays. Further investigation will be required to assess the full role that access to care played in the cases of delayed presentation.

The mean length of follow-up (9 days) in this study is too short to make definitive conclusions as to long-term complication rates following appendectomy in this

population. However, it would be expected that the majority of cases of postoperative wound infection would have presented within this time frame. Scher and Coil have presented that perforation leads to a 47% risk of postoperative complications while only 3.1% of nonperforated cases go on to suffer the same fate.⁴ The findings of two cases of postoperative wound infection in the five cases of perforated appendicitis results in a 40% early complication rate for these patients. There were no complications noted in the nonperforated appendicitis patients. This data correlated well to the expected historical norms provided by Scher and Coil. The data suggests that the appendectomies performed in the field environment met the standards for rate of complications seen in the civilian fixed medical facilities in the U.S. This data also suggests that military surgeons finding perforated appendicitis at the time of operation should strongly consider leaving the wound to heal by secondary intention or delayed primary closure.

In Guidry and Poole's review of 100 consecutive appendectomies in 1994, they report a mean patient stay of 4.4 days for indurated appendicitis, 3.8 days for suppurative appendicitis, and 13.7 days for perforated appendicitis in their study population.⁵ In the OEF patient population, it is difficult to assess at what point in time the individuals would have met discharge criteria for medical facilities in the U.S. With the average time of arrival for this group being 3.3 days (not including the patient that convalesced in theater for 14 days), and the fact that 62% of them were immediately discharged to billeting, it would appear that post-operative stays would likely fall within the accepted values.

Service Performing Abdominal Surgical Procedures:

13 Appendectomies and two open Cholecystectomies

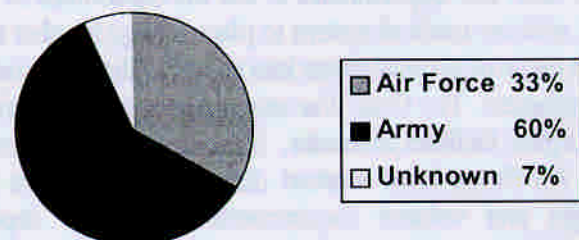


Fig 6.

Of the 15 patients whose cases were reviewed in this article, nine were treated in an Army surgical facility, five

in an Air Force surgical facility, and one in an unknown surgical facility (Figure 6). Therefore, the data from this study should be applicable to both services' surgical teams in evaluating the quality of care provided. The risk associated with aeromedical evacuation in the post-operative period for patients with abdominal surgeries is often concerning to deployed military surgeons from all services. All 15 patients from the combined study group underwent postoperative aeromedical evacuation within the military system at least once with flight duration greater than 6 hours. There were no reported complications in these patients related to their transportation to LRMC in the current evacuation system. This demonstrates that the capabilities of the aeromedical system can support the movement of stabilized post-operative patients over long distances with excellent results and safety for the patients.

In conclusion, this review of the care provided by deployed general surgeons in OEF showed that capable surgical care for non-battle-related abdominal pathology can be provided by the current military surgical teams. Times to discharge appear to be acceptable and complication rates fall within civilian standards. Post-operatively, these patients appeared to do well in the aeromedical evacuation system. The most apparent concern is the delay from onset of symptoms to evaluation by a surgeon in a significant subset of the study group.

This led to an increased severity of disease and was reflected in a higher complication rate. This finding should alert commanders to the need to maximize force health protection by encouraging servicemen to seek medical attention at the onset of symptoms as operational requirements allow.

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Impact of 9/11 and OEF on LRMC Operations

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Introduction

At 1400 hrs on 11 Sep 01, the Operations Division at Landstuhl Regional Medical Center (LRMC) hosted a meeting with representatives of U.S. European Command (EUCOM) and U.S. Special Operations Command concerning casualty evacuation and treatment and an upcoming mass casualty exercise. During the meeting, a member of the LRMC staff entered the conference room and informed everyone that a plane crashed into the World Trade Center. Initially, it seemed that a tragic accident had occurred. Soon, an additional plane struck the second tower, another impacted into the Pentagon, another crashed in Pennsylvania, and the initial reports were broadcast that these were acts of terrorism. The meeting quickly adjourned to another room in the hospital that is used as the LRMC Emergency Operations Center (EOC) and has access to CNN and the Internet. Everyone in the room watched as the nation responded to each of these tragic events and wondered what would happen next. No one in the room yet realized that in the months to come, the processes and relationships established in this meeting would be instrumental in the nation's response to the events that occurred on 11 Sep 01.

Immediate Response

As it became obvious that the U.S. had been the victim of a terrorist attack, U.S. forces in Europe, to include LRMC, began to react. Late in the afternoon, the S-3 of the 415th Base Support Battalion (BSB) notified the LRMC Operations Division that the Force Protection Condition (FPCON) was being upgraded to FPCON Delta. Assumption of this FPCON requires substantial changes in the way both the hospital and the installation perform their missions. As the senior commander on the Landstuhl installation, the LRMC Commander also serves as the Installation Commander, therefore, the LRMC Operations Division also serves as the Installation S-3. The LRMC Commander directed the Operations Division staff to immediately begin implementing FPCON Delta

Antiterrorism/Force Protection (AT/FP) measures while awaiting publication of an operations order by the 415th BSB. Fortunately, an AT/FP Battlebook for the installation was available that provided a detailed outline of the actions required to assume FPCON Delta. These actions included establishment of the LRMC EOC, implementation of the installation barrier plan, guard force requirements, changes to the installation access plan, and numerous other AT/FP measures. The existence of a detailed battle book and recent AT/FP exercises conducted on the installation allowed for a smooth transition to the new FPCON. A roster of soldiers to augment the contract guards on the installation was maintained, and training was provided monthly. This allowed the installation to rapidly augment its guard force with trained personnel. The most significant change on the installation was access procedures. On the morning of 11 Sep 02, there were three entry/exit gates operational at Landstuhl. Personnel could access or exit the installation at any of these gates. At FPCON Delta, vehicular traffic was limited to one access gate and one exit gate. This concentrated the available guard force, minimized possible access points, and ensured required FPCON Delta measures could be accomplished, specifically ID checks, and vehicle searches.

Within the EOC, numerous actions were taking place to ensure the hospital would be able to continue to provide its health care mission under this FPCON. These actions included activation of the unit alert roster to ensure LRMC personnel were accounted for and aware of changes that were occurring on the installation, especially concerning installation access procedures. Action was also being coordinated through the Public Affairs Office to ensure patients traveling to the hospital were aware of the changes to the access procedures. Operations during the immediate response to the 11 Sep attacks were primarily force protection related.

The EOC remained operational for 1 week. Again, the primary focus was on force protection issues and improving the AT/FP posture of the installation. Issues

addressed included coordination with host nation police forces for added off-installation security checks, requests for increased installation security patrols by military and security police, and coordination with the BSB and USAF concerning force protection measures at other installation activities, such as the Department of Defense Dependents School, Child Development Center, and installation housing areas. The area of greatest concern was the traffic problem created by the new access procedures. Initially, traffic was causing delays of up to 2-3 hours at peak times. Through the improvement of procedures and assigning of additional guards at peak times, the wait was reduced to typically less than 1 hour. The greatest concern concerning traffic was access to the installation by emergency vehicles. Specific procedures had to be developed and coordinated to allow emergency vehicles rapid access to the installation while at the same time implementing appropriate force protection measures.

After 1 week, it was determined that the EOC was no longer necessary and that the Operations staff could manage the force protection mission from their normal office. EOC personnel were released from EOC duties but the equipment remained in place so the EOC could be rapidly reestablished. Since then, the LRMC EOC has been activated 3 times, either in response to an incident or as part of an exercise. Additional procedures have also been developed for the establishment of a LRMC EAC. The EAC is a smaller, tailored-to-the-mission EOC that can function for longer periods of time with less impact on the medical center.

Expansion Planning

In early October, LRMC received a mission from U.S. EUCOM to establish 150 medical surgical beds at LRMC to support future operations. Although the facility had been designed to support many more beds than this, changes over the years to provide more outpatient services and administrative areas, coupled with ongoing renovation projects, made this a challenging task. The Department of Nursing began an effort to identify all spaces in the hospital that could support hospital beds. This eventually resulted in a Microsoft Excel spreadsheet that described each room in the hospital, to include the availability of oxygen and suction.

Simultaneously, the hospital Deputy Commanders

for Administration, Clinical Services, Primary Care, and Nursing began developing the additional staffing and equipment requirements that would be needed to support the increased number of hospital beds. Eventually, it was determined that an additional 253 personnel were required to staff the 150 medical surgical beds. An additional seven personnel were required to operate all 12 intensive care beds in the facility, and an additional 16 personnel were required to expand from the normal five operating rooms to the facility maximum of eight. Additional equipment requirements were passed to the Logistics Division.

Development of the additional staffing requirements and the identification of locations to put the additional hospital beds took several days. When both of these tasks were complete, it became obvious that a logical, incremental expansion plan could be developed to support the theater bed requirements and also minimize the impact on continental United States (CONUS) hospitals that would be required to deploy the additional personnel needed. The additional hospital beds were located in five separate areas of the hospital. If the additional staffing requirements could be broken down to support each of these five areas, personnel deployments could be tailored to incrementally support bed requirements. This was soon accomplished and a detailed, incremental expansion plan was developed and briefed to the European Regional Medical Command (ERMC), U.S. EUCOM, and the Office of The Surgeon General. The trigger point for each incremental expansion was the number of nursing care hours on each ward. When the number of nursing care hours exceeded the capability of the ward, the next expansion increment would be requested. The LRMC developed a "surge" plan, which allowed the hospital to meet any expansion requirements up to 96 hours, which was the amount of time required to deploy the additional personnel from CONUS. Using staff from administrative sections of the hospital and support from other units within ERMC accomplished this.

There were four requirements that did not allow for an incremental expansion. These were for services determined to be critical to mission accomplishment but unavailable at LRMC. These four requirements were for a 61J (Burn Specialist), a Vascular Surgeon, an Intervention Radiologist, and a Neurosurgeon. The Neurosurgeon requirement was met when LRMC contracted for a Neurosurgeon soon after 11 Sep. The requirements for the

three additional specialists have been met through the deployment of both active and reserve component physicians from CONUS.

Subsequently, another mission was received to provide an additional expansion capability using beds and staff from a U.S. Navy Fleet Hospital. Using the spreadsheet previously developed, and in conjunction with personnel from the U.S. Navy hospital, it was determined the additional expansion requirement could be met using the existing facility. Detailed plans were developed that would enable Navy personnel to rapidly deploy from CONUS, fall in on prepositioned equipment, and establish operational beds within 5 to 7 days.

Emergency Management Plan (EMP)

As the referral medical center for Europe, Southwest Asia, and much of Africa, LRMCMC is frequently involved in the medical response to emergencies throughout its area of responsibility. The bombing of U.S. embassies in Africa and the terrorist attack on the USS Cole are just two examples of recent incidents in which LRMCMC has played a key role. The mission of the medical center, as well as participation in recent incidents, has resulted in a detailed, well-organized EMP. The LRMCMC also conducts frequent exercises of the EMP with other military units within the Kaiserslautern military community, to include U.S. Air Force units at Ramstein Air Base. After-action reports conducted after each implementation of the plan, either in response to a real-world incident or during an exercise, continually refine the plan. These changes are incorporated into the EMP during annual updates of the plan.

The LRMCMC Commander, Deputies, and the Operations Officer use the Mission, Enemy, Terrain, Troops, Time, and Civilian concept to determine which portions of the plan to implement. Specific sections of the plan that have been frequently implemented during support of Operation Enduring Freedom (OEF) include the mass casualty management plan, public information, communications, and the VIP plan.

Casualties

Since operations began in Afghanistan in Oct 01, LRMCMC has treated over 800 casualties evacuated from the

theater. Details on the types of casualties and specific injuries can be found in other articles in this AMEDD Journal. As described previously, the procedures outlined in the EMP for the planning and execution of the casualty reception, treatment, and evacuation missions were modified based upon the situation. Some of the modifications and lessons learned during support of OEF are provided below.

One of the major changes being incorporated into the EMP, as a result of OEF support, is the use of TRANSCOM (U.S. Transportation Command) Regulating and Command and Control Evacuation System (TRAC2ES) for casualty reception planning. This change is primarily applicable to situations in which 8 to 24 hours notice will be received before the arrival of casualties. The LRMCMC has developed a process, that using data entered into TRAC2ES prior to evacuation, enables the hospital to develop a basic reception plan prior to the arrival of the casualties. This process begins upon notification of incoming casualties, either through communications with units in the theater, liaison officers (LOs), or through TRAC2ES. Once notification is received, a group forms in the EOC or another appropriate location, and using the data provided by TRAC2ES, is able to identify accepting physicians, surgical cases, probable ward assignments (Intensive Care Unit, Medical-Surgical, etc), and additional manpower requirements. All incoming casualties are, of course, seen in the emergency upon arrival, but in most cases we have found that the TRAC2ES data is accurate. This system allows the hospital to organize assets and greatly facilitates casualty reception process.

Another valuable lesson learned was the value of LOs. This was particularly evident when Landstuhl received 22 casualties on 18 Apr 02, many from the mistaken bombing of a Canadian infantry unit by a U.S. F-16. Three members of the Canadian Army located in Frankfurt, Germany, arrived at Landstuhl prior to the casualties and were integrated into the LRMCMC EOC. These soldiers were able to provide invaluable assistance to the LRMCMC staff while the Canadian casualties were being treated. Additionally, similar assistance was provided when LRMCMC treated casualties from other nations. Specific duties these LOs were able to perform included the notification and casualty updates of appropriate members in their chain of command, public affairs, and

other administrative tasks.

One of the most significant issues that developed during the treatment of casualties from OEF involved translator support. The LRMC maintains a detailed listing of translator support available to the facility, which includes over 30 different languages. However, soon after ground operations began in Afghanistan, LRMC began receiving anti-Taliban Afghan soldiers. A total of 24 of these casualties were subsequently received. The primary language of these casualties was Phastu, unfortunately not one of the languages available at LRMC. The Operations Division was able to locate a translator at the local Military Intelligence Detachment, but within 45 days this soldier was deployed to Afghanistan. Alternate translation methods had to be developed, which eventually included volunteers from other local installations working for the U.S. Government and use of an AT&T translation service available via telephone.

Reserve Component (RC) Support

The RC has been invaluable to the success of LRMC in its support of OEF. Many of the specialists (vascular surgery, interventional radiologist, and burn specialist) requested have been RC officers. Each of these specialists provided an essential service that was key to the success of our mission. Additionally, LRMC was able to request additional lines in our Overseas Deployment Training program that provided training opportunity for RC units as well as support to the LRMC staff.

Force Protection

Force protection remains a top priority for the command and the soldiers assigned to Landstuhl. To accomplish the force protection mission, Landstuhl has been augmented by soldiers from the Army National Guard. These soldiers are integrated into the Landstuhl AT/FP guard force and provide continuous force protection to the installation. Keys to the success of the force protection mission have been the training of soldiers on AT/FP duty, force protection exercises, and supervision by the leaders assigned to the installation.

Additionally, LRMC has played a key role in the development of community force protection plans, specifically, medical response plans. Specific emphasis has been given to developing response procedures following use of a Weapon of Mass Destruction weapons and numerous exercises have been conducted.

Conclusion

The LRMC's mission statement is "To serve as America's beacon of health care for it sons and daughters abroad." Support to OEF has given LRMC the opportunity to execute and accomplish this mission. The Operations' Division has played a key role in the successful accomplishment of this mission.

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LRMC Logistic Support for OEF

In order for logistics to be successful, it must comply with the operational concept. Included in this were three basic logistics principles that must anticipate requirements, be proactive in support, and minimize impact of reactive requirements.

Landstuhl Regional Medical Center (LRMC) had no current expansion mission. In past years, however, a Facilities Engineering logistical support Concept Plan had been developed. The Concept Plan included detailed facilities engineering drawings for such services as medical gases, power, grids, and water/sewer services.

Three key elements supported the basic logistics principals that created the environment for successful support operations. There were contracting support, logistical support from Quartermaster and base support units, and key leadership involvement. But the element that provided synergy to all other elements was the ingenuity and sheer determination of the enlisted military. Events produced the most difficult missions. They were the expansion plan execution; the support of additional patients with radically different types of wounds/injuries than usually treated at LRMC; and, receiving, storing, and planning to establish elements of a 500-bed Navy Fleet Hospital (NFH) as a fully integrated addition to LRMC's capabilities.

- The expansion plan execution involved inpatient, outpatient, staff, and administrative space relocations. Once that was begun, medical beds, equipment, and materiel were moved into those vacated areas. Facilities engineering support followed close behind.

- The support of new types of patients involved closed coordination between the clinical staff. Medical materiel types and quantities were analyzed and medical materiel staff analyzed current stocks and new requirements.

- The NFH site establishment and integration proved the most challenging mission. This required tri-service multifunctional logistics coordination. Add active-reserve

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component, and the lines of communication became even more blurred. The mission centered on moving NFH in 20 and 40 foot shipping containers pre-positioned in Europe to LRMC. The NFH arrived at LRMC on 26 Dec with 8 inches of snow and ice on the ground, and freezing temperatures. The Base Support Battalion provided low bed trucks and some forklift capability in conjunction with contracted forklift capability. Personnel support for this mission came from the LRMC Logistics Division and 226th Medical Logistics Battalion located in Missau. This part of the mission took almost 24 straight hours. The NFH was then to be stored near LRMC. Site preparations for a large number bed site were also begun as part of the overall contingency expansion plan of the fixed facility (see page 57).

All five functional areas of the LRMC Logistics Division played key roles. Also, the European Regional Medical Command Contracting Cell (ERMCCC) played an instrumental role. In fact, the military contracting officer was the central force in the overall success of all three missions. He displayed the entire necessary key leader and technical expert traits to ensure seamless logistics support in the planning, preparation, execution, and control that created the environment for success. He performed duties well outside his routine job description and excelled in all aspects.

Contractor Support

The LRMC Logistics Division did not have the required assets (equipment, space, or people) to pack, move and store the volume (approximately 20,000 pounds) of administrative equipment and furnishings. Due to the urgency of the need and the magnitude of the project, several contracting offices were notified for possible assistance in the accomplishment of the mission within command directive time frames (less than 72 hrs). The ERMCCC found a company to pack, pick, and transport equipment and furnishings from the hospital to a storage site at a warehouse on another Army installation several miles away. The mission also called for reversing

Distracters

Type	Reason
Joint Commission for Accreditation of Hospital Organizations (JCAHO) In Mar 02	Loss of personnel to work JCAHO tasks; loss of command support for additional personnel when required to work OEF
Daily Mission Support	Loss of personnel for key OEF tasks when personnel required to conduct daily support to hospital and clinics
Physical Space	Limited space both inside and outside the hospital complex
Weather	Cold and wet winter weather affects personnel work conditions and condition of equipment, grounds
Time	Compressed time schedules to meet mission; competing multiple events and tasks; continued loss of daylight in winter months to work outside without other light sources impacts light sources
Constant Change	Impacts planning process and execution phase
Lack of Communication	Not knowing who to call because of multiple Department of Defense agencies; poor access to telephone/e-mail directories

the process at a time to be determined later by the government. In less than 48 hours, a contract was awarded and the company was onboard packing, moving, storing, and securing medical equipment and furnishings from the ward. Additionally, contracts were established with local companies to furnish additional beds and medical equipment as required by the clinical staff.

Facilities Engineering

The initial mission was to work with LRMC security and the Navy to identify a suitable site for a NFH. The NFH is completely self-sufficient including tents, beds and medical equipment, generators, storage tanks, and waste removal vehicles. A Combat Construction Engineer platoon is responsible for utility and base support operations. With all of its support requirements, a NFH requires over 30 acres of fairly clear level space. There was not sufficient space for the entire hospital within the LRMC post compound. Two locations were identified outside the compound. The mission was modified to finding a suitable location for a slice of the fleet hospital. Two sport fields within the LRMC compound were

identified as potential sites and both were within a few hundred meters of LRMC hospital. In an effort to reduce the organic hospital utility support staff and equipment cost estimates for increasing the installation electrical, water, and sewer capacity near the chosen field were completed. Using instillation utilities eliminated the need for generators, fueling operations, and waste removal. The Combat Construction Engineer platoon would only be required for initial set up of the hospital.

The next mission was to determine if there was sufficient bed capacity within the Medical Center for the NFH slice. A hard facility is always better than a tent and there was a concern about having a dual standard for patients. The LRMC was originally designed as a 1,000 bed hospital. Over the last several years, clinical and administrative functions have replaced most of the inpatient functions, however, the support infrastructure for minimum care inpatient beds still exists. Curtailing or relocating clinical and administrative functions within the Medical Center would free enough space for the NFH slice equipment and staff from the NFH would support patient care within the facility. Facilities engineers worked

closely with the nursing staff in developing an incremental expansion plan within the medical center. Facilities engineers' focus was ensuring utilities could support patient care in the areas we were expanding to. Areas with no piped medical gases would have to be supported with bottled gases, for example. The capacity of the electrical distribution system within the medical center was expanded during Desert Storm and determined to be more than adequate. However, difference in electrical current was a major problem because the facility is a 220 volt current and the NFH equipment was 110 volt current. The use of transformers satisfied the problem. Nurse call systems were installed in several clinical areas and could be used for inpatient operations. There was concern that some of the contingency bed space did not meet the minimum JCAHO square footage requirements, however, everyone believed better patient care would be provided in a hard facility than in a tent.

Property Management

Property Management Branch played a major role in support of the first mission. The branch coordinated with the U.S. Army Medical Materiel Center, Europe (USAMMCE) for a loan of 67 hospital beds, over bed tables from the Humanitarian Assistant Program (HAP) controlled by the U.S. State Department, and two surgical tables to support the newly established surgical ward. Beds that had been previously stored by LRMC for future contingency operations did not meet the current standards of care. The LRMC logistics staff and soldiers from 226th Medical Logistics Battalion assembled the HAP equipment and conducted technical inspections. The branch then coordinated with Homburg University Hospital for a loan of 10 hospital beds for the newly established surgical ward as part of a previous Memorandum of Agreement with the two hospitals. The branch concluded the first mission by coordinating the move of equipment and furniture from Addiction Treatment Facility (ATF) Ward to Property Management Warehouse for temporary storage. This included coordinating with local moving companies for pick up of ATF equipment and furniture to store in contractor's warehouse. Again, this required LRMC logistics staff and soldiers from 226th Medical Logistics Battalion to provide the bulk of manual labor. In close coordination with ERMCCC and Wiesbaden Contracting Office, the branch requisitioned 60 hospital beds, bedside commodes, infusion pumps, and wheelchairs for the newly established surgical ward.

During the NFH establishment mission, this branch assisted ERMCCC with personnel support. The key to mission success was to keep the ATF operational while displacing inpatient care and administrative office.

Medical Maintenance

The Medical Maintenance Branch also played a major role in the first mission. This branch unpacked, performed technical inspections, and assisted in the assembly of all medical equipment and patient beds for the expansion. This branch received, installed, and prepared for use a field computerized tomography x-ray unit (CT) returning from use in Kosovo. The CT showed up with a certification 3 years past due, missing parts that were located in Kosovo, its initial storage in Utah, and the medical maintenance facility at USAMMCE, and some were never found. The shelter the CT was housed in was in poor working order and also missing key components. After 5 months of constant work, the CT was finally certified for patient use.

Medical Materiel

The primary role of the Medical Materiel Branch was to provide the hospital with medical and nonmedical supplies. The initial task was to establish contingency push packages for high volume areas in the hospital (Operating Room, Emergency Room, Surgical Ward). The branch coordinated with the ward masters to identify essential items that were listed on their respective supply catalog and coordinated with the ward masters to identify any unusual items that were available in the normal supply channel. Once necessary items were identified, the branch procured \$590,000 worth of medical supplies for these contingency push packages from the USAMMCE and local purchases. The branch established eight new OEF accounts in the Defense Medical Logistics Standard Support System, which allowed customers to order online items specifically for the OEF mission. By establishing these accounts, this branch was able to have visibility of the items ordered, which allowed capture of demand history on items (identifying items that are critical and are at zero balance). Also, the expense summary on these accounts allowed tracking the exact dollar amount on the items ordered.

Environmental Services/Housekeeping

Cleaning to infection control standards required

additional temporary personnel support. The patient load did not increase substantially, and no permanent additional housekeeping staff was required.

Lessons Learned

Close staff coordination and communication between tri-service, multifunctional logistics, and operations agencies was paramount to ensure a seamless mission execution. Understanding the programmed patient population and clinical staff requirements to support that was critical in determining mission tasks. Involving contract support as an integral force in the planning phases was instrumental to mission successes. Last, adaptability was the primary tool to overcome the seven distracters.

Current Missions

- The expansion mission was completed. However, casualty and patient load did not require full use of the

entire expansion project, to the relief of all involved. At some future date, the ATF will be fully re-established within the hospital.

- The contingency medical materiel packages that were purchased are now stored and managed by the medical logistics community. Additional equipment that was purchased is now being used by the clinical staff.

- The components of the NFH are currently stored in an environmentally controlled location. Much work remains to make it an effective contingency option at LRMC. Stock and equipment location, control, and rotation must be programmed.

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Bridging Language and Culture Barriers

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Introduction

Soon after the tragedy of 11 Sep 01, the medical staff of Landstuhl Regional Medical Center (LRMC) geared up to receive casualties from Operation Enduring Freedom (OEF) – the first soldier arrived on 17 Oct. However, little prepared these health care providers for the unanticipated challenges they faced when providing medical care for some of the Afghan Freedom Fighter casualties.

Between Dec 01 and Mar 02, 21 Afghan casualties were treated at LRMC. Twenty of the men were Pashtun opposition fighters; one was a noncombatant teenager. Only one of the men spoke English, and he did not arrive until well after the first group. The initial group of six arrived after being injured on 5 Dec, secondary to a “friendly fire” incident while supporting U.S. Special Forces. Most had received their initial medical treatment by U.S. forces in Afghanistan and then had been transported to amphibious assault ships for stabilization prior to their flight to LRMC. Those needing specialized services not available at LRMC, primarily prosthetics, were eventually transferred to Walter Reed Army Medical Center (WRAMC), Washington, DC.

LRMC and OEF

Just as the war on terrorism relied on nondoctrinal tactics in the earliest days, creativity was required in the nondoctrinal medical treatment of these casualties in the months following 11 Sep. The template for health care specific to a war evolving on new ground, under unique circumstances, and with emerging allies was developed in response to these recent challenges. The LRMC, a joint branch health care center with facilities in Germany, Italy, and Belgium, provides a wide range of health care services. With the mission “to serve as America’s beacon of health care for its sons and daughters abroad,” its military focus is to “enable the warfighter.” Falling under the European Regional Medical Command, LRMC serves a large community of active duty service members,

retirees, civilians, and family members. Given its geographic location, LRMC also plays a critical role in the provision of health care for soldiers, airmen, sailors, and marines deployed in support of OEF. Decisions for determining the eligibility for medical services provided to non-American casualties came from Central Command and involved coordination with the Department of Defense as well as the State Department for those requiring additional care at WRAMC. At LRMC, the Deployed Warrior Medical Management Center (DWMMC) was established to coordinate OEF patient needs and to communicate up and down this chain of support.

The purpose of this article is to share the strategies used by our multidisciplinary team in bridging the language and cultural barriers presented by these casualties. This is not a clinical study, but rather an accumulation of oral histories. Contributors included Army and Air Force physicians; Army, Air Force, and civilian nurses; allied health providers, and pastoral services. All were eager to share their stories. Many expressed the hope for a “template” or method to improve care as a result of their shared experiences. The LRMC Chief of Pastoral Services cites the “importance of sharing this information so we can grow.”

Medical-Surgical Ward

As a reserve nurse, I immediately launched into a higher state of readiness following 11 Sep. Most of us didn’t wonder “if” we would be activated, just “when” and “where.” Within a few months, several members of my reserve unit performed a 2-week Overseas Deployment for Training at LRMC where we helped provide daily nursing care for the OEF casualties. My fellow Reservist had arrived at the Medical-Surgical Ward 2 days before I did. We talked nightly, discussing the incredible experiences she had treating Pashtun wounded, but nothing could have prepared me for my experience.

I had seen Afghan people, but not in person. Now I

was “up close,” trying to communicate through their pain and fear. Given the language differences, I focused on nonverbal indicators. I was struck with their uninhibited and intense gazes, as well as their soft voices. The “leader” said to me, through an interpreter, “we look for caring eyes.” Clinical training had not prepared me for this.

Obviously, post-trauma care was compounded by the unique combination of language and cultural barriers that existed between the Afghan patients and their health care team. Raised during the dramatic combination of war with Russia and persecution from the Taliban, these men had been blasted out of their country and sent across the globe on a journey. For most, the trip would not end at LRMC. They arrived in a strange land, via their first air flights, after having a 2,000-pound bomb land within 300 feet of them. Several had amputations and perforated tympanic membranes and most had shrapnel injuries. All were in pain, physical and emotional, and were now thousands of miles from their families and friends.

We were immediately impressed with the health care efforts that had already taken place in the field, in transport, on ships, and at LRMC. Nurses worked frantically to understand enough Pashtun to attend to the needs of the wounded men and worked long days to meet the demands. Physicians were continuously assessing, treating, operating, and reassessing. Physical therapy was already working with some patients’ contracted joints and with debilitated patients who couldn’t sit up by themselves. In the midst of it all, we were constantly looking for language translation and cultural understanding.

Unlike treatment of English-speaking patients from western civilization, our Afghan patients spoke a language and observed customs highly foreign to us. These differences caused some delayed patient understanding, a vital ingredient in the health care process. It was also determined that the general education and knowledge levels were limited and would require extensive explanation from staff attempting to communicate medical concepts and choices. A volunteer translator helped bridge that gap in the afternoons and evenings.

Team and Template

It was obvious there was no “template” for referencing patient care for this group. Certain elements,

however, led to development of such a care plan. A team with some experienced players had evolved. Some of the LRMC team had treated casualties from the USS Cole and a number of them referenced the lessons learned from that event as an important ingredient in their tool kit.

The chair of the DWMMC was appointed by the LRMC Ethics Committee to be the “guardian” for patients who were intubated and could not speak for themselves. He stated that “my job was fourfold – to receive and analyze incoming information about OEF patients; to help mobilize hospital personnel and resources in preparation for incoming flights; to serve as a screening physician for the ‘walking wounded’; and to prepare a daily report on the conditions of the OEF patients for the commands in Southwest Asia, LRMC, and the continental United States.”

The Patient Administrative Division worked to ensure that all aspects of patient transport, admission, and family connections went smoothly, with the DWMMC playing a key role in the coordination. All patients were housed on the Medical-Surgical Ward, a long, busy ward designated for medical and surgical patients. In an effort to ensure continuity of care, nurses were assigned to the same patients. The LRMC medical staff and support teams had prepared for a large influx of patients long before 11 Sep and, as the LRMC Chaplain described, “had been planning for all contingencies by training. We were looking at the hospital’s possible role before 9/11, and the start of OEF. It is part of our duty to work with staff and communities to meet their needs. Therefore, we already had in place Red Cross, Social Services, mental health, and chaplains in the Kaiserslautern area, including LRMC.” The inpatient physical therapy (PT) tech became a primary force of the team in the stabilization and rehabilitation of OEF inpatients.

Afghan Freedom Fighters

The largest contiguous group of Afghan patients treated at LRMC were comprised of six casualties who arrived in mid-Dec. They had been wounded in a “friendly fire” bombing incident while working with U.S. Special Forces near Kandahar. As is common in bombing injuries, the wounded sustained limb losses as well as eye, ear, and multiple shrapnel injuries. After being stabilized in Afghanistan, they had received their first line surgeries

on-site, on amphibious assault ships, and then were transported to LPMC. These patients were housed together in two adjoining wardrooms, in an effort to enhance their sense of security. The youngest member of this group was 14 years old, while the eldest was 40 years old. Shortly after their arrival, it became clear that there was an internal structure to this group, similar to the clans that exist in their homeland. The identified leader held group meetings when necessary; a structure that greatly facilitated communication with the Charge Nurse. She could communicate needs about any Pashtun through the leader, while the Chaplain utilized the group structure to talk and identify their spiritual and cultural needs.

For security reasons, the men were given code names using colors. When they discovered the curious coding, they teased each other with new names, like "indigo" instead of "blue" and "czar" instead of "gold." They joked about this being better than having the same names of "Mohammed" or "Khan."

The 14-year-old had been working with his Plar (father) the day they were wounded. He sustained major trauma to his upper arm and arrived with an external fixator – an immobilizing metal structure with supports pins, which stabilize bone until healed. He later told me that when this bombing occurred, he had only been home for 2 weeks from a Pakistan civilian hospital, where he had been treated for head and shoulder injuries over a period of 4 months after he fell from a tree. He pointed to a tall pine tree on the LPMC grounds while telling his story. While his father was able to journey over the mountains bordering Afghanistan and Pakistan for monthly visits, he had not seen his mother or brothers during that 4-month period. These histories came out gradually, as treatment progressed, pain subsided, trust developed, and we became surrogate family for the Afghan patients.

The teenager stands out in the memories for many, partly due to his combat injuries, despite his youth, but also due to his intellect and eagerness to learn. Extremely dedicated to the idea of "school in the United States," his linguistic appetite was voracious. He used his new knowledge to teach the other patients, improving their comfort levels. Being the youngest, by far, it was difficult for him to fit in with the other patients' talk and group sessions. He had no peer, yet he challenged himself and others. The civilian nurse in the ward also complimented

the teenager as being more adult than most young people; very well-mannered. "He said to our commander, in perfect English, 'excuse me' when he walked away! Its poignant to see someone that young want to improve himself."

The Charge Nurse recalls the eldest Afghan patient who, at 40 years old, "looked 60 or 70 and was in ill health...he was so poorly nourished, his skin was sloughing off. Among other things, he had mouth injuries so we were concerned about how to feed him...He was in great pain. It was wonderful to see him progress to the point where he was able to go home." For the PT tech, the Afghan group leader, identified as "Purple," stands out. He was eager to do the exercises required to learn to walk with a leg prosthesis after suffering an amputation. "Sometimes I had to ask him to slow down. He was my demonstrator...I didn't know he was their leader, but if I had difficulty with another person, I would go get him."

An Air Force Nurse remembered "the 18 and 19 year old soldiers from the 10th Mountain Division. It was their first experience in hand-to-hand combat...they were ambushed...it was eye opening for them. Some had no prior belief in God before they came to war, but here, they were clinging to their crosses." In perspective, consider the anxiety this nurse witnessed in her English-speaking patients, and imagine their distress, should they have been treated in Afghanistan, by Pashtun-speaking doctors and nurses, without a translator.

Bridging the Language Barrier

How different from one another are Arabic and English? The two languages may sound extremely unique from one another; however, there are many common English words that are thought to have Arabic origin. Cannon and Kaye explain the Arabic contributions to the English language as evolving when trade between Arabic-speaking and European businessmen rose during the 7th century. Occasionally, we discover common words between the two languages that entertain both English and Pashtun participants. These words include: tchi (sweet tea); naranj (orange); masjid (mosque); shakka (jacket); qahwa (coffee); jamal (camel); qand (candy); pistachio (pistachio); sukkar (sugar); and shocolot (chocolate).

Even with these similar terms, there is still much variation between English and Pashtu communication. Concepts of thought seem much simpler than the English way of thinking. Yet, the Pashtun words seem more complex to one uneducated in Arabic. I once spoke to the 14-year-old patient about his emotional needs through an interpreter, including his passion for education. My lengthy oration was interrupted by the interpreter, who told the teenager two words. Surprised, I asked if he was going to relay the rest of the message. He said, "Not necessary. I said 'be patient.' Now he knows."

The Army, Air Force, and civilian nurses were quickly challenged to learn the most basic words, as these were trauma patients in pain. Translations taken from Ismail Sloan's Word List, and reinforced by the Pashtun patients were:

Dahrt	pain
Jorday	no longer ill (we soon overused the term for everything "good")
Las	arm, hand
Sar	head
Starga	eye
Zura	heart
Wraz	day
Saba	tomorrow
Hafta	week
Miasht	month
Kal	year
Yao, dwa, dre	one, two, three...
Wayal	speak
Charga	chicken

Over the course of time, we began to be cheerfully greeted with handshakes and English greetings (Good Morning! How are you?). The patients were delighted to hear us return with "Salam!" (greeting) or "Sparzi PahHey" (good night).

A physician described the difficulty "in accurately assessing patients on a day-to-day basis due to the scarcity of translators. Subtle clues, such as facial expressions and body position, were extremely important when patients could not discuss their concerns and issues in verbal detail. At one time, I had three patients named Mohammed in the same room, none of whom spoke English. It led to some interesting 'conversations.' " According to another Air

Force Nurse, "We got an interpreter for awhile and developed a list of basic words and pictures." A later arrival, "spoke English very well...he drew beautiful pictures of the American flag...he wrote 'We love America.' "

The Chaplain believes that language is only a small part of communication, "yet we use it so much because it's easy." We managed to "talk" to the Afghans by speaking at a "deeper level" than language. It's a sign that we realize our commonness, when we can talk across a language barrier and achieve understanding. We received confirmation of understanding by the tone of voice used to respond, by nonverbal indicators of understanding and, eventually, their verbalization of "Hokay" or "Hu-ah."

Body language was vital to acting out communication. Gesturing became theatrical and amusing at times. The civilian nurse found the Afghan patients, who had not been eating well, staring at their food. "They were thinking it was pork. They don't eat pork. We all got down and clucked like chickens to let them know it was chicken...that's crossing the language barrier! They said "charga," meaning chicken, and started eating."

The Charge Nurse referenced an evolving friendship as a means to communication with the Pashtuns. "We had them longer...an opportunity most nurses don't have... we had become friends...that's how we bridged the language barrier. We devised a list of words and phrases. We came to an agreement on the words through gestures. The true Pashtun interpreter found it amusing how we had used some terms...for example, "Jorday" really means "no longer sick...but we used it to mean 'good' for everything!"

An established method to assess discomfort relies upon the pain scale measurement tool, an instrument that allows a patient to grade and report his or her own pain. The 1-to-10 scale is designed so that "1" is minimal pain, while "10" represents excruciating pain. The Afghan teenager, caught on right away as we learned to count to ten in Pashtun, and demonstrated "1" level of pain versus "10" level-pain. In kind, he learned to grade his pain using English numbers and systematically demonstrated the lesson to the other Pashtuns each time they reported pain. We felt these casualties seemed more tolerant of their pain, seeming to complain less about their discomfort than other patients.

I had a patient who had walked into a house with Special Forces in Kandahar to retrieve documents. While carrying the documents outside, he stepped on a landmine and lost his foot, a fingertip, perforated an eardrum, and sustained various shrapnel wounds. As would be expected, he experienced a great deal of pain when his stump dressing was changed. After pre-medicating him, I tried singing while removing the old bandages. He gently "shushed" me and asked his roommate to sing. The roommate came near the bed, smiled and sang the most soothing song in Pashtun. My patient bravely made it through that dressing change and many others the same way.

Cultural Barriers

Of immediate concern for the nursing staff were the cultural differences and barriers that existed between men and women in Afghanistan. The nursing staff at LPMC was predominantly female. We exercised caution, while building trust, and were reminded that the Taliban was responsible for much of the gender separation. The true cultural beliefs are that male doctors do not treat female patients and male patients should exercise modesty. However, an Air Force physician described, "The patients' exposure to women in western clothing seemed to be another issue. Many times we asked the translator to talk to them about staring at women...primarily an innocent fascination over something that they had not seen in Afghanistan, but some other patients and staff did take offense to this attention from the Afghans."

As noted earlier, the Afghan people have incredibly beautiful eyes. They unabashedly stare directly into the eyes of another person, and do not "blink" or look away after making eye contact. This cultural difference made some nurses and doctors uncomfortable, initially, until they adjusted.

The PT tech experienced a unique situation as a female, being "the one who put them in more pain with gait training and therapeutic exercises, versus nurses and doctors who provided pain relief." She surmises, "that may be why I was called 'the evil one' for a little while." The Charge Nurse also felt she was "the bad guy, when it came time to give the teenager pin care around his upper arm external fixator. You had to be aggressive to move the skin back away from the pins. His arm hurt. I didn't like that

role, but I felt I had to do it."

Dietary differences were compounded when a patient had oral or digestive track trauma. Fortunately, they learned to love Ensure, a nutritional supplement drink. Special attention was given the Afghans by the LPMC dietary department, with attempts to match available foods to their diet choices.

Obviously, religious/cultural mores had to be taken into consideration. The local Muslim community, as well as the LPMC Chaplains service, provided a great deal of assistance in these matters.

We witnessed that the Afghans considered collective prayer an obligation. They prayed at least 5 times per day using a prayer rug. Occasionally, an individual would seek private prayer, using a shower stall or praying under the bedcovers. The civilian nurse stated, "We learned their schedule and respected it. If they were in this position we waited at the door or went away. If they came to the door, they would ask us in."

Informed Consent

"Informed Consent" is the process by which a patient understands and agrees to the medical treatment that will be rendered to him or her, before it is given, and as explained by the physician providing the care. These documents were executed only through an interpreter. As local interpreters were in very short supply, this documentation occasionally required extreme improvisation. We used multiple interpreters for informed consents: the civilian translator, the AT&T operator, two Arabic translators from Ramstein, and a Pashtun-speaking doctor in Nebraska who had been located by AT&T.

The DWMMC chair, as Afghan patient "guardian," was a positive tool toward achieving Informed Consent. When asked if the health care providers truly believed the Pashtun patients understood what was about to take place, several responded that they believed the patients put their trust in the provider because, "we knew what we were doing and they wanted to get better and go home." This trust factor was felt to be a critical component, as the patients were faced with complex medical concepts and procedures. It appeared that once a patient agreed to treatment, they willingly proceeded to prepare for it, with

the support and compassion of their fellow patients also an important factor.

Opportunity to Change

When asked what they would change about the experience, if they could, many of those to whom I spoke didn't hesitate to vote overwhelmingly for proactive measures. Many identified the need for an official, dedicated patient case manager to be at the top of the "After Action Review" evaluation list. We need someone who has an opportunity to know the patient history, family dynamics, and get in touch with their families; to pass on to grieving, wounded patients what their family status is, and to let families know how their loved one is and that he is alive. When you have that emotional need met, and the patient is as enthusiastic about healing and returning to duty or country as these guys were, then you've impacted that person and their health...you've eased the way for all involved. These special needs, such as family support, became an additional concern for health care providers. Pashtun patients were concerned that their families would die of starvation in their absence. For example, one man explained that he needed to go home immediately, without waiting for a foot prosthetic, so his family would not starve.

Translators were also identified as being a high need early in the process, with a focus on continuous availability, as they were at WRAMC. An Air Force physician perceived the need for "beefing up our capacity so we could take care of these folks or streamline the process to get them through. No accepting physician is necessary to get these folks here. We need the same latitude in getting folks to WRAMC. Sometimes it was an administrative nightmare to get them there." A staff nurse described the emotional component of administrative delays, stating, "red tape delayed their return. They are so close to their families. Medically, they can go, but paperwork takes another few weeks and they get depressed. I would change that if I could..."

Personal Benefits

The Army Chaplain described, "long days, but they were challenging, exciting, and rewarding...I had a sense of pride in watching others make a difference." A physician cited her highlight as "the Afghan patients...

they were grateful for anything we did for them...it let people see why we do what we do." One nurse identified the feeling "...when you see people better; to see them smiling as they leave...especially, the teenager...to make a change in his entire life...that he wants to come back and go to school; to change from being a wartime kid and become more intellectual." A staff nurse named "seeing people go home walking, talking...going from one nonfunctioning state, totally dependent on us, to leaving independent." A physician described his pride in "serving my country in a time of need, seeing the patients get better, and working with some incredibly hard-working colleagues." The Charge Nurse reported "seeing the overall health of the patients increase. It gave me an opportunity to see things I should truly be prepared for as an Air Force nurse. I've had an opportunity without being deployed, to look at wounds from the battlefield."

An Air Force physician discussed "seeing the patients through their injuries, and home, or to the states." Another physician described his conversation with the Afghan patient who spoke English well and "was able to tell me a great deal about what life was like in Afghanistan, both under the Taliban and during the war."

The PT tech said, "I will never forget these guys... They left an impression: to be proud to be an American and be thankful you are able to help somebody...We take so much for granted...These guys have been fighting forever." The civilian nurse stated that "these people were very thankful for us...It brought me joy to know we did all we could and they understood that."

Many described the professional growth and personal fulfillment they felt as a result of their involvement with these patients. A physician wished he "had volunteered to work as the Operational Physician from Day 1, when the first casualties were coming in." The Charge Nurse saw teamwork as a gain. She felt that "we have incorporated into a team designated for OEF patients...and, as a result, have changed LRMC as an organization." This author's personal benefit was to know we made a difference at a poignant time for someone, by using our training, compassion, and thinking outside the box.

Experiences Led to Challenge

Many of the health care providers discussed the

relevance of their prior military and medical experience with other nationalities as tools for this experience. Some have friends of Persian or Afghan nationalities. A nurse acknowledged, "LRMC has a unique mission of being the primary hospital in Europe, but the important strength is that Command listens and supports staff in dealing with the unique circumstances. I found this encouraging."

The DWMMC chairman recognizes the importance of his years of residency/training, as well as the benefits gained from being deployed in the past. Some nurses give tribute to their faiths, with the former stating, "It helps me get back to where I belong." The Chaplain paid tribute to his "strong, spiritual relationship...having been wounded, emotionally as well as physically, having suffered (finger) amputations, having served in foreign countries, coming from a large, diverse family, and dealing with family issues."

The author called on faith, respect for cultural diversity, creative thinking, and being open to opportunities as they arose. This was not the time for textbook health care delivery. Yet, we wanted to give consistent, quality care. We had to open our hearts and minds to patient healing and comfort. If that meant learning some fundamental words in a new language, displaying trustworthiness, being a mother, utilizing their group and individual dynamics, then we did it.

Conclusion

Language and cultural barriers were bridged during treatment of OEF patients with both traditional and

inventive strategies. Writing a doctrine, from these strategies, uses the experience as it should be used: as a valuable tool to evaluate our performance and the effect on a separate culture and as a template for future events. How much the barriers hindered communication, and therefore health care delivery and patient comfort, is difficult to measure with subjective tools. The differences did present additional challenges to healthcare providers and anxious moments to patients. Access to on-site translation services would have reduced the "hassle factors" involved with the language and cultural barriers and may have reduced the initial distress experienced by both the patients and the staff. Finally, the need for a designated, and dedicated case manager was strongly voiced – especially for seriously wounded patients who are facing lengthy hospitalizations far from family and friends.

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